TANGANYIKA TERRITORY

DEPARTMENT OF AGRICULTURE

ANNUAL REPORT

1947

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POLICY

Agricultural policy has been and is being directed towards maximum food production in the interests of East Africa as a whole while maintaining and, if possible, increasing the export surpluses of commodities such as sisal, cotton, coffee and oil seeds, as a contribution to world needs and to the continued welfare of the people of the territory.

At the same time departmental field investigation is directed towards the maintenance and improvement of soil fertility and to securing increased crop yields per acre by better farming methods involving proper cultivation and manuring. Demonstration and propaganda amongst the people are aimed at achieving conservation of soil and water and the improvement of the productivity of the land.

While some native administrations have promulgated orders to enforce improved cultivation practices, it would be overstating the case to say that there is anything like a general awareness of what good farming means and there is a great lag between the proven practices of the experiment stations and the methods of the majority of the people. Nevertheless, some progress can be recorded but further advance depends upon an increase in supervisory staff, which is much below establishment, for continuous contact with the people is necessary if progress is to be made in a country where effective propaganda can only be performed by word of mouth.

SECTION I.—GENERAL REVIEW OF THE YEAR

In the vast spaces of Tanganyika, no season can suit all crops in all areas. Nevertheless, the 1947 season was one of the best suited to crop production for many years, over most of the Territory. Rainfall was well distributed and above average. In the Highland areas—usually more favoured by the rains—precipitation was excessive. This caused some destruction of crops by floods and disease. Such losses were not important in a season of such general abundance.

The surplus of produce available for sale was greater than usual, and prices remained attractive to producers. Marketing and prices remained under control.

Exports of agricultural products declined. This is accounted for by such factors as increased local consumption, some congestion of marketing and transport facilities resulting in a carry-over of surplus produce to 1948, replenishing of depleted stores as an anti-famine measure, and in the case of collected wild products loss of interest by collectors because of their preoccupation with an abundant harvest. Production of plantation products

was generally maintained, and in some cases would have been greater had labour been more plentiful.

NON-NATIVE AGRICULTURE

Estate agriculture continued to expand during the year. Where production has not been maintained, this has been due to circumstances beyond the control of the producers. The District Production Committees in Arusha, Moshi, Tanga, Iringa, Morogoro and Kilosa continued to give valuable assistance, especially in stimulating production of native foodstuffs by estates for the feeding of labour. In addition valuable assistance in the production drive was given by many other associations, boards, and marketing organizations.

Sisal production was maintained but exports declined by some 15,665 tons to 95,856 tons; in spite of this, the value of this export was £553,000 greater than in 1946. The coffee crop was a good one and exports increased. Quality was fairly good and would have been better if adequate labour had been available for picking. Tea production and exports declined at the end of the year because of an unusually hot and prolonged dry season. Pyrethrum production declined owing to unsettled markets. Papain production was the same as in 1946. Production of wheat, tobacco and seed beans were adversely affected by persistent late rains which favoured the spread of disease.

NATIVE AGRICULTURE

Abundant harvests of native foodstuffs were secured in all areas, bringing quick relief to those places where the people had suffered from famine or food shortage in 1946 and early 1947. For some years there had been food shortages of greater or lesser severity in some parts of the territory, so that the securing of an abundant harvest was an occasion to celebrate. There was a long back-log of tribal ceremonies to be attended to. As a result it became apparent, towards the end of the year, that preparations for planting were being neglected. A carefree improvidence and relaxation of effort had replaced the anxiety of the years of shortage. Scanty early rains brought quick realization of this situation and it was retrieved before the end of the year. The grain stores in the areas of chronic famine are full. Six thousand tons have been stored against famine in the Central Province alone.

The surplus of native foodstuffs available for sale was much greater than usual. Even the Central Province had 1,236 tons of grain surplus to requirements, after placing 6,000 tons in the famine reserve stores. All provinces record sales of grain well above the average. Surpluses of groundnuts sold in the Lake, Western and Southern provinces were above the average of the past few years. Paddy and rice surpluses were also above the average despite some destruction by flooding. Pulses were sold in large quantities, particularly pigeon peas, which crop was not adversely affected by the heavy late rains.

Cash crops, which in many cases are foodcrops as well, had varying fortune according to whether they were tolerant of heavy rain or not. Another important factor which affected production of those cash crops which are not also food crops, was that natives were preoccupied with retrieving the food position after the 1946 shortages and so tended to neglect the purely cash crops and concentrate on food production. Cotton production in the Lake Province was somewhat below the average of recent years despite a record production in Musoma District. Persistent late rains accounted for this. In the Eastern

Province conditions favoured pests and a crop promising 10,000 bales produced 6,631 bales only despite a greatly increased acreage. Southern Province production dwindled in favour of food production, and in favour of more remunerative cash crops. Sesame, the bulk of which comes from the Southern Province, was an average crop. Tobacco suffered from excessive rain and the crop was small. Products of collection such as beeswax tended to be neglected because of abundant harvests.

The significance of the general increase in production by natives must not be neglected. The war years created a great demand and provided the bait of high prices. Unsatisfactory seasons, poor harvests, partial hunger and exhortation were the goads. The result was larger fields of native crops, so that the propitious 1947 season produced an abundance of food. To keep this increased acreage under production, to prevent erosion and to maintain fertility are the problems which are now to be tackled. We can no longer view the prospect with equanimity, for the abundant harvest has been secured at the cost of some soil capital.

LABOUR

The supply of labour has been short of the requirements of non-native producers, especially in the sisal and coffee industries. Legislation early in the year to co-ordinate the use of available labour to the best advantage helped considerably. The demand for labour increased rapidly with the development of such works as the groundnut scheme and its ancillary operations, such as railway and port construction. Restrictions on the planting of new acreages of pawpaw, coffee, tobacco, pyrethrum, sisal and tea had to be retained to avoid wasteful competition for available labour.

In established agricultural industries, the conditions of employment of labour have improved steadily as a result of the work of the Labour Department, and the Labour Utilization Boards which have been set up for the different industries.

MARKETING

The marketing of most agricultural products remained under control, with a system of guaranteed prices. In general the trend of price revision has been upwards. Sisal prices rose from £48 9s. to £78 9s. per ton for No. 1 quality and marketing through the Sisal Controller and the Board of Trade continued. The marketing of other non-native produce was carried out effectively through the same organizations as in 1946.

Native produce was mainly marketed through Native Authority markets in a satisfactory manner. Shortage of gunny bags and congestion of transport facilities caused some delays so that in some parts of the Territory there were considerable quantities of surplus produce still in the hands of the producers at the end of the year.

The marketing of Kilimanjaro coffee and Songea tobacco was carried out by the two co-operative unions as in the past.

During the year, the Mbosi Coffee Growers' Group, the Rungwe Coffee Growers' Group, and the Rungwe Rice Growers' Group, formed co-operative societies to market their respective crops. They carried out these functions smoothly.

The Muheza orange crop is marketed by Messrs. Dalgety and Co., Ltd., acting as agents for the local native treasury.

Up to 1946, the War Supplies Board, Nairobi, purchased the bulk of the crop, but have now ceased to do so and marketing difficulties have arisen. A measure of reorganization gives promise of overcoming such difficulties.

Marketing of the Iringa flue-cured tobacco crop has been beset with difficulties arising from disagreements amongst the producers and the various organizations representing them. So much was this so that a select committee was appointed by Government to meet the planters in an attempt to resolve these difficulties by providing enabling legislation for the appointment of a sole marketing agency.

Because of the general improvement in the food crop position there was less inducement to indulge in "black-marketing" than during the years of shortages. Nvertheless, rice production remained short of the demand, and considerable quantities disappeared into uncontrolled markets.

SOIL CONSERVATION

There has been continued progress with conservation measures in all areas. Such progress is slow because natives are not generally aware of the dangers of erosion. Patient teaching is therefore necessary, as well as the enforcement of conservation measures promulgated by the native authorities. Progress with this teaching is most marked in areas of dense population and land scarcity. It can be readily understood that in areas of sparse population, and shifting cultivation on plentiful land, such teachings are less readily appreciated and progress is slower. Nevertheless, the sparsely populated Western and Southern provinces record progress.

Methods of conservation must vary to meet the varying conditions, but the most generally applicable method for native agriculture is the contour tie-ridge method. It may be supplemented by contour banks, hedges, dykes, grass strips, weed rows, manuring, planting eroded gullies, preserving hilltops and catchment areas, controlling fires, etc. In the Central Province a large gang of African instructors has concentrated on the repair of many miles of contour banks prepared in previous seasons and on the pegging of contour lines for the construction of new contour banks. In the Lake Province tie-ridging is becoming established in many areas, but progress is slow in others. Contour banks and hedging have been carried out over many miles of the Northern, Tanga and Southern Highlands provinces. In the Eastern Province a soil conservation gang is in training for the Ulanga District and elsewhere moderate progress is recorded with the construction of contour banks, demarcation of grass contour strips, preservation of vegetation against fires and other suitable measures. In the Southern Province moderate progress has been made with the demarcation of important catchment areas and the enforcing of the contour tie-ridging system of cultivation.

LOCUSTS

A small immature swarm of the desert locust was reported in the Longido area and hoppers of the same species in Kondoa-Irangi in February. These swarms and bands were destroyed. No other reports of this species were received during the year and fortunately the threatened invasion from the north did not take place.

There were no reports of the migratory locust.

Red locust swarms which had escaped from the Rukwa Valley breeding ground during 1945/46 reinvaded that area and the situation became very

threatening. There seemed to be every prospect of widespread egg laying in the western parts of Tanganyika towards the end of 1947 and after a full discussion of the subject at a conference held in Lusaka it was decided to make plans to meet the emergency. While working in full collaboration with the International Red Locust Control Service this department undertook the responsibility of dealing with the probable invasion of the Malagarasi swamps An entomologist was detached to take control of these operations. By the end of the year he had engaged a large European and African staff and had arranged for food supplies, insecticide and equipment; a fleet of motor vehicles had been purchased and a network of tracks had been cut through the bush—in fact all preparations for an anti-locust campaign to begin early in 1948 had been made in good time.

In the Rukwa area itself very active operations were undertaken against red locust hoppers, by the International Red Locust Control. In addition to these measures experiments were conducted to determine the value of ground dusting from motor-driven vehicles and of spraying from the air and further work on these lines is projected.

PESTS AND DISEASES

Those pests and diseases favoured by a wet season were widespread and destructive.

Cotton suffered from the attacks of American bollworm, and all the usual pests. Red bollworm was very destructive in the Southern Province, Blackarm disease is now considered potentially serious in the Lake Province in that it is agreed that new varieties should have some proven resistance to it.

Coffee suffered from stem borers in the Northern, Bukoba and Southern Highlands areas. Antestia and leaf-miner were also recorded as causing damage, and Hemileia took a heavy toll in Moshi District. Increased attacks by Stephanodores are recorded from Bukoba.

Banana weevil caused considerable damage in Bukoba and the Kilimanjaro banana areas.

Coconut Beetle took its usual heavy toll.

Stem borer was widespread in maize and sorghums.

Thrips caused little damage except for a small amount of seasonal damage to pyrethrum.

Other pests noted as causing damage to crops were cutworm, armyworm, bean beetle, sesame flea beetle, aphis, white fly, elegant grass-hopper, nematodes, snails and lady birds.

Diseases favoured by the wet season were early and late blight, scab, Bacterial wilt, leaf roll and brown rot on potatoes; Hemileia on coffee; leaf and stem rusts on wheat; Frenching, mosaic, angular spot red rust, and the newly-recorded Kromnek disease in tobacco. Armillaria in tea; smut in sorghums and the usual fungoid and bacterial diseases of native crops.

The most destructive vermin were rats and field mice. In the Eastern Province this plague took a very heavy toll of the grain, bean and cotton crops. The abundant harvests and inadequate storage gave them every chance to multiply.

Of larger vermin and game, pig, baboon, monkey, various antelope, elephant and hippopotamus took their usual toll which was not so severely felt as usual because of the general abundance of crops.

EXPORT CROP FIGURES

The following table shows the principal exports of the Territory since 1940 with the values of those for 1947:—

	Maximum output for export prior to 1947		1940	1941	1942	1943	1944	1945	1946	1947		Value per ton f.o.b.
			Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Total Value	
	Year	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	£	£ Shs.
Sisal	1942	136,237	78,528	75,195	136,237	96,598	111,848	110,637	111,521	95,856	5,469,443	57.01
Sisal (manufactured)	1936	2,325	5	15	26	30	8	–	–	–	–	–
Cotton Lint	1941	13,106	10,624	13,106	8,009	7,002	5,944	7,192	3,958	7,045	788,879	111.03
Coffee	1935	18,588	15,634	13,667	14,828	10,898	15,561	14,441	10,021	13,858	976,741	70.10
Groundnuts	1936	22,786	8,185	11,312	13,193	1,752	627	955	475	3,534	95,067	26.18
Hides and Skins	1939	4,286	3,946	3,512	2,993	2,339	2,871	2,259	3,527	*†4,609	517,298	112.05
Copra	1928	9,318	3,095	3,620	3,700	2,816	1,368	5	312	40	700	17.10
Sesame	1938	5,241	2,052	3,018	3,563	3,180	1,712	1,441	929	493	10,303	20.18
Rice	1941	17,965	15,204	17,965	17,948	4,673	4,494	2,171	70	2,615	55,624	21.05
Millet and Mtama	1928	7,732	4,514	3,280	3,348	913	1,501	3,804	315	4,741	57,651	12.03
Maize	1934	2,901	2,831	940	713	9	–	20	–	1,875	34,272	18.06
Beeswax	1945	795	468	712	348	586	627	795	732	410	131,136	319.17
Tea	1946	625	316	340	483	503	328	400	625	446	65,499	146.17
Sugar	1941	5,454	4,876	5,454	4,380	1,813	4,293	1,130	315	838	20,278	24.04
Gums (Copal and Arabic)	1944	2,567	965	1,405	904	390	2,567	1,712	1,540	1,554	85,583	55.01
Ghee	1942	1,385	1,213	1,125	1,385	750	400	249	327	44	3,888	88.07
Wheat	1945	4,511	1,450	2,475	2,166	1,887	1,960	4,511	324	–	–	–
Tobacco (unmanufactured)	1944	1,122	506	649	820	1,052	1,122	935	924	667	83,201	124.15
Rubber	1944	1,314	13	7	213	451	1,314	2,320	1,019	49	8,886	181.07
Vegetable Oils (Coconut and Groundnut)	1940	2,268	2,268	1,718	1,720	1,056	983	1,801	1,009	900	65,139	72.07
Papain	1945	101	18	15	21	39	64	101	100	*109	306,485	2,811.16
Onions	1944	2,007	989	1,265	1,204	1,896	2,007	1,849	1,925	1,754	39,158	22.06
Pyrethrum	1945	697	244	229	305	306	396	*697	668	241	27,020	112.02
Fats, including substitute for Ghee and Butter	1944	1,247	–	1,039	273	664	1,247	650	783	71	4,735	66.14
Mangrove Bark	1942	7,291	4,655	6,383	7,291	3,205	5,100	4,927	5,490	3,408	38,930	11.03
	–	–	162,595	168,446	226,071	144,808	168,342	165,002	146,909	145,157	8,879,916	–

*New highest export tonnage. †Includes 3,416 tons hides and 89,480 scores skins weighing at approximately 1,500 per ton.

Notes on the Chief Export Crops

Sisal

Although exports declined, the production was only slightly less than in 1946. Inadequate labour supplies and the fact that much old sisal went out of production before new plantings came into bearing kept the production lower than it would otherwise have been. The value of exported sisal was greater than in 1946 by £553,000, because of higher prices.

Territorial production in comparison with previous years was as follows:—

Year	Tons
1941	81,640
1942	99,024
1943	102,369
1944	111,313
1945	112,218
1946	106,808
1947	105,552

Production by Provinces

	1946		1947
	Tons		Tons
Tanga and Northern provinces	60,609	...	60,599
Central Line	36,075	...	33,839
Southern Province	10,124	...	11,114
	106,808	...	105,552

The Sisal Controller on behalf of the Board of Trade continued to purchase and ship the total output. The system of inspection before shipment functioned satisfactorily. The price of No. 1 quality sisal rose from £48 9s. per ton to £78 9s. and the other grades in proportion.

The big demand kept production up to the maximum possible and many estates are now beginning to feel the effects of the intensive drain upon soil fertility. The industry is alive to the dangers and the Sisal Experimental Station at Ngomeni and estate managers are studying how to restore and maintain fertility on depleted lands.

Coffee

(a) *Native Coffee.*—The comparatively poor crop of 1946 rested the coffee plants, so that the good rains of 1947 brought a very good crop to maturity. In the Northern Province a record crop estimated at 4,300 tons of native produce was anticipated. The Bukoba native crop amounted to 8,450 tons. In Ngara a poor crop of 120 tons was secured. Southern Highlands Province natives produced 226 tons and other areas some 115 tons between them. Progress in the field treatment of coffee has been maintained in the main native producing areas. In Bukoba the native authorities have made rules covering the question of mulching and field treatment of coffee and are now responsible for seeing them carried out. Results have been good. In the Northern Province steady improvement in the field is reported. The Moshi Native Coffee Board continued its work for the improvement of the native coffee industry. They had to abandon two of their propagating centres as being unsuitable and a shortage of clonal planting material has hindered the work. The coffee training school is nearly ready for occupation.

(b) *Estate Coffee.*—In the Northern Province a bumper crop was secured and in spite of this, the trees are said to be in better condition than for some

years. There was a considerable proportion of "buni" and other low grade coffee because of a shortage of labour at picking time, and due to the fact many trees were unable to mature the heavy crops they bore. Coffee producers in the Southern Highlands and Usambaras also enjoyed a good season and produced good crops.

The marketing arrangements through the Tanganyika Coffee Growers' Association Limited, to the Ministry of Food was continued at the bracket price of £125 to £150 per ton. This was satisfactory.

The following table shows the total production of non-native coffee expressed as parchment from the coffee growing areas for the past four years:—

Production in tons : Parchment

Year	Province			Total
	Northern	Tanga	Southern Highlands	
1944	2,558	116	115	2,789
1945	2,992	110	306	3,408
1946	827	45	60	932
1947	2,635	136	383	3,154

Cotton

The persistent rains did not favour the cotton crop and production declined in spite of increased plantings in all the main producing areas. The Lake Province crop of 32,250 bales was 1,000 bales short of the average of past years. Musoma District produced a record crop of 3,700 bales but other districts in the Lake Province produced much less than was expected. In the Eastern Province increased acreages were planted and growth was satisfactory. Persistent late rains, however, favoured cotton pests and the crop which promised 10,000 bales produced no more than 6,636 bales.

In the Southern Province production was restricted to those areas outside the red bollworm quarantine area. Natives regard the crop as less remunerative and reliable than other cash crops of the area. Also, at the planting season they were preoccupied with their all-important food crops and neglected cotton planting. All these factors coupled with the wet season reduced production to 100 tons of seed cotton.

The production of the various provinces was as follows in bales of 400 lb. lint:—

Province	Average 1939-1946	1946	1947
Lake	34,265	33,817	32,250
Eastern	11,254	4,835	6,636
Northern	1,809	374	403
Tanga	1,207	326	492
Southern	985	290	182
Total	49,520	39,642	39,963

Groundnuts

The groundnut crop was a moderately good one compared to recent years, but still far below record production. This was due to concentration on staple food crops following the shortages of earlier years, and consequently less extensive plantings. The season was generally favourable, and disease does not appear to have been a limiting factor except in the Southern Province where rosette disease reduced the late crop.

During the year the Groundnut Scheme got going with vast preparations for production of groundnuts by the most advanced methods. This scheme took its origin in a suggestion made by Mr. R. W. R. Miller, C.M.G., then Director of Agricultural Production, and now Member for Agriculture and Natural Resources, when he suggested to the United Africa Company Limited, production of groundnuts and other crops by mechanical means on a comparatively modest 100,000 acres. The company considered it a practicable proposition, capable of vast expansion and placed their own proposals before His Majesty's Government. A commission was appointed, its report was accepted and the scheme came into being. There have been setbacks and disappointments in the preliminary stages of the scheme, but there is little doubt that they will ultimately be smoothed out. Tanganyika's share of this scheme is a very large one. Tsetse fly and lack of surface water had protected vast tracts of fertile land from wasteful native agriculture. It can be seen, therefore, that what has hitherto been regarded as the Territory's greatest drawbacks have, in fact, conferred preferment on Tanganyika so far as this very enlightened experiment is concerned.

Clearing and planting started in the Kongwa area of Mpwapwa District and some 7,000 acres were planted. This is a modest beginning to what will prove to be the largest single production scheme in the world. In the Southern Province, where the largest areas are to be planted, the construction of a new railway and port is going well and soon more spectacular developments will take place.

Sesame

The bulk of this crop comes from the Southern Province where it is readily produced under very favourable conditions. A wet season does not favour this crop, but it was up to average in 1947. Elsewhere in the Territory a moderate crop was secured.

Grains

The season was the most favourable experienced for many years for native grain production. Prior to 1947 poor seasons had resulted in poor crops. Cultivators, under this stimulus and exhorted by Government, had increased their fields of grain. The result was that the favourable 1947 season produced bumper harvests over most of the Territory.

(a) *Rice.*—Generally this crop was a good one and destruction by flooding was not serious. The demand for this grain is great and even the good 1947 season could not supply all that was required. In consequence, much of the produce disappeared into the "black market".

Recorded sales of paddy amounted to 27,605 tons as follows:—

Province	Tons
Lake	8,200
Eastern	6,444
Western	3,933
Southern	3,586
Southern Highlands	3,382
Tanga	2,000
Central	60
	27,605

To this total must be added the considerable quantities which disappeared into the black market.

(b) *Wheat.*—The prolonged wet season favoured the spread of rust in this crop and in some areas no crop was reaped because of this. Leaf rust was particularly destructive in the Northern Province. In that province production was as follows:—

	1945 Tons	1946 Tons	1947 Tons
Non-Native	2,549	2,754	1,985
Native	739	132	274
Wheat Scheme	6,837	3,350	2,267
Total ...	10,125	6,236	4,526

The Western Province marketed 31 tons and Songea District 620 tons. In the Southern Highlands Province non-native farmers showed little interest in wheat production. Native planting increased in the Njombe and Mbeya districts but very little was marketed.

(c) *Maize, Millet and Sorghum.*—The season suited these crops and excellent harvests were secured. Marketing was hampered by lack of gunny bags and transport and at the end of the year considerable surpluses remained in the hands of producers. Recorded sales were:—

Province	Tons
Southern	14,821
Eastern	13,680
Northern	11,314
Southern Highlands	8,002
Central	7,235
Tanga	6,425
Lake	4,200
Western	3,835
Total Native Staple grains	69,512

Non-native maize plantings, encouraged by Government, were extensive but not always productive owing to lack of labour and in some cases the planting of unsuitable land. The Production Committees alone administered some 39,000 acres of maize under the government's scheme for encouraging production of maize.

The Southern Province sorghum crop was a good one. Over 10,600 tons were marketed and considerable quantities were left in the hands of the producers.

Copra

Production of copra fell off badly during the year owing to heavy consumption of fresh nuts early in the year when other food was scarce, owing to the difficulty of preparing copra in such a wet season, and to heavy shedding of immature nuts. This industry has been unsatisfactory for many years and in 1945 legislation was enacted for the improvement of the industry generally, but lack of adequate staff prevented the implementation of this legislation. In the Tanga Province native authority rules enforced two close seasons in order to reduce thefts and to stop attempts to prepare copra during the rains. In the Southern Province the clean-up of coconut groves was in abeyance for lack of staff. In the Eastern Province only the Bagamoyo District received close attention.

Total production for the year amounted to 5,448 tons only, as compared with 10,000 tons in 1945, and 9,058 tons in 1946. Practically the whole of the crop was used locally and only 40 tons were exported.

Tea

In spite of rainfall being above average, the dry season was prolonged and did not produce the mist and damp conditions suited to tea production. Production declined, especially in Mufindi, due to this cause. Production figures were as follows:—

	1945	1946	1947
	lb.	lb.	lb.
Usambaras ...	398,000	339,192	342,000
Mufindi ...	559,243	671,267	573,957
Rungwe ...	320,471	470,460	454,557
	1,277,714	1,480,919	1,370,514

New plantings, and infilling of old plantings, is going ahead, restricted only because of the difficulty of obtaining seed from India. Some local seed is being used but little is known about the performance of local seed.

Sugar

The only estate producing plantation sugar is in the Northern Province. On the estate 7,202 tons of plantation and 304 tons of coarse sugar were produced as against 7,250 tons plantation and 400 tons coarse sugar in 1946. In the Southern Highlands, Eastern, Tanga and Southern provinces "jaggery" is produced on an increasing scale and very considerable quantities of sugar cane are consumed raw by natives. There is room for a great deal of expansion of this coarse sugar industry to meet an ever increasing local demand. Suitable land is available.

Tobacco

The wet season favoured the spread of disease in this crop and production was not up to that of former years.

(a) The small Biharamulo fire-cured crop amounted to 80 tons and quality was good. Grading was simplified to meet the needs of the growers and the buyers.

(b) The Songea fire-cured crop was down to 174 tons, and owing to disease, quality was poor. The local Tobacco Board is instituting a measure of reorganization designed to repopularize this once popular crop.

(c) During the year a start was made to introduce fire-cured tobacco growing in the Kibondo area of the Western Province where a high priced cash crop is urgently needed. Similar conditions prevail here as in the Biharamulo District of the Lake Province and it is intended that the Kibondo crop should be marketed through the Biharamulo marketing organization.

(d) The Iringa flue-cured crop produced by non-native planters amounted to 838,397 lb. Quality was up to average. The high prices have attracted back to Iringa many who gave up tobacco production in 1945/46, and the demand for land for tobacco production is greater than is at present being made available by the Land Office. Grading and marketing were beset with difficulties because of lack of agreement among planters as to how their crop should be handled. This led to the appointment by Government of a select committee to examine into these matters.

Tobacco is a dollar saving crop and it would appear that there is room for considerable expansion of production of this crop for export from the Territory,

provided that sufficiently high standards of quality can be attained to satisfy the European market. There is room for limited expansion for local consumption.

Pyrethrum

The Southern Highlands Province and the Northern Province remained the only producing areas. In the Southern Highlands production dropped when a number of planters accepted the Board of Trade's offer of compensation for going out of production from June till December because of unsettled market conditions. The uncertain future of the pyrethrum market caused some planters to replace this crop with others. In other cases planters have continued to deliver pyrethrum in the hope of ultimately obtaining a suitable price.

In the Northern Province production declined because of voluntary curtailment by producers.

Production was 303·5 tons in the Southern Highlands and 203 tons in the Northern Province.

Papain

Prices for this commodity continued to rise early in the year and the demand for land for planting pawpaws increased with the rising price. Prices reached Shs. 31/00 per pound in April, but thereafter the market became uncertain, The price had dropped to Shs. 17/00 per pound at the end of the year.

Yields were generally poor because of prolonged rain and overcast weather and the plants were in poor condition until the warm weather in November brought about improvement. Nevertheless exports during the year reached 112 tons, the highest figure recorded to date.

Seed Beans

This highly specialized industry is located in the Northern Province. Production again increased to 560 tons as against 543 tons in 1946. This increase was disappointing because the acreage had been very greatly increased. The persistent rains favoured the development of disease so that quality was not so good as in the past and there was a high proportion of rejects.

Onions

The main producing area is the Northern Province where a moderate crop was secured amounting to 1,959 tons. Small quantities were produced elsewhere in the Territory.

Onion seed production at Mbulu again suffered very severely. This year the fungus *Botrytis allii*, which causes neck rot, was mainly responsible and as a result only 252 lb. of seed were produced. Thrips continued to be present but this pest was not so serious as in previous years. Because of the succession of disappointing seasons it was decided to abandon this scheme.

Minor Crops

Cinchona.—Production is confined to the Usambaras in Tanga Province, where production of bark has been as follows:—

	Tons
1945	71
1946	92
1947	49

Increased plantings have taken place and it is now estimated that there are five million trees in the Eastern Usambaras and on the eastern slopes of the Western Usambaras.

Derris.—Production in and around the Usambaras declined. Production has been:

	Tons
1944	16
1945	39
1946	44
1947	15

Essential Oils.—Two and a half tons of bitter orange oil were produced.

Condiments.—Two and one third tons of black pepper and five and three quarter tons of chillies were produced in the Tanga Province.

Palm Oil.—The Western Province produced 297 tons of this oil against 17 tons in 1946: 34½ tons of pericarp oil was produced. In the Tanga Province production amounted to 25 tons of oil and 17 tons of kernels.

Pedigree seed of oil palms from the Congo have been widely distributed for trial. They were obtained through the kind co-operation of the United Africa Company Limited.

Tung Oil.—There were no new plantings of this crop. The acreage remained at about 210 acres and production about 15 tons of nuts in the Usambaras.

Cocoa.—At Sigi Segoma estate in the Tanga Province, 2·85 tons were produced.

Cashewnuts.—From the Southern Province 1,312 tons were exported and 348 tons from the Eastern Province. The demand is good and newer plantings are coming into bearing. It is a dollar earning crop although the bulk of it is shipped to India in the first place for processing before being sent to the United States of America.

During the year a number of enquiries were received about the possibilities of establishing processing plants within the Territory but so far nothing has materialized.

Native Starch.—One hundred and twenty-one tons were marketed in the Eastern Province and 12 tons in the Southern Province.

Beeswax.—Four hundred and ten tons were exported. This is a big reduction due to neglect of collectors because of the excellent grain harvest. Exports for the past few years were:

	Beeswax		Honey	
Year	Tons	Value	Cwt.	Value
		£		£
1942 ...	348 ...	57,640 ...	2,357 ...	3,464
1943 ...	586 ...	102,603 ...	17,355 ...	31,848
1944 ...	627 ...	110,276 ...	3,462 ...	6,430
1945 ...	795 ...	132,297 ...	3,045 ...	5,690
1946 ...	732 ...	189,733 ...	1,701 ...	4,078
1947 ...	410 ...	131,136 ...	2,363 ...	7,242

Gums.—(*Copal and Arabic*).—Exports amounted to 1,554 tons valued at £85,583. The following are the figures:—

Year	Tons	Value £
1942	904 ...	40,107
1943	390 ...	21,916
1944	2,567 ...	114,657
1945	1,712 ...	107,274
1946	1,540 ...	91,962
1947	1,554 ...	85,583

Rubber.—There was no collection of wild rubber in the Southern Province owing to the movement of the population from the main collecting area (Liwale) as an anti-sleeping sickness measure.

Production of plantation rubber under Rubber Control came to an end in 1946 but private enterprise on Sanje Estate (Eastern Province) produced a total of 103,326 lb. from about 170 acres of Hevea rubber trees.

Castor Seed.—The high price of 35 cents per kilogram is attracting more of this crop. The Eastern Province alone produced 698 tons for sale and the Central Province 306 tons. The previous record for the Territory was 421 tons in 1946.

Root Crops

Cassava

Extensive planting of this crop as a famine reserve has been encouraged for many years. Heavy drawing upon this reserve became necessary in the years of shortage and the 1947 task was to ensure replanting to bring up this reserve to a reasonable figure again. This was achieved and the excellent grain harvest made all cassava produced surplus to requirements. There is a considerable carry over to 1948, and in the Newala District of the Southern Province alone it is estimated that there is some 12,000 tons available of which 8,000 tons could be sold without seriously depleting the famine reserves.

Sweet Potatoes

In many areas shortage of planting material prevented full advantage being taken of the greatly improved planting conditions as compared with the previous succession of very dry years. To ensure future supplies of planting material in the Central Province, where the shortage was particularly acute, communal plots were planted and at the same time a drive to obtain as many individual plots as possible was instituted. Production of very large quantities of tubers was particularly noticeable in the Northern parts of Sukumaland where surplus supplies were sliced and dried for storage.

European Potatoes

A total of 768 tons of European potatoes passed through the markets. Had marketing and transport difficulties not been encountered a further few hundred tons of native grown potatoes would have been available for consumption from the Mporotos in the Mbeya District. The increasing influx of Europeans into occupation in industry and commerce has created a greater market for this commodity and efforts are being made to fulfil requirements.

But increased production is seriously handicapped by blight. Promising results are being achieved, however, at Lushoto with the testing of various blight resistant varieties introduced from the Scottish Society for Research in Plant Breeding, Corstorphine, Edinburgh. Eight varieties previously imported were maintained under test while a further seven were introduced during the year from the same source. Multiplication of the more promising varieties should yield a sufficient quantity of seed for distribution to other areas for further multiplication before the end of 1948.

Legumes

The year proved an excellent one for the production of legume crops of all descriptions. In all some 14,657½ tons passed through the produce markets. Such figures are misleading, however, as they do not record movements such as direct sales to consumers. For instance, in the Tanga Province it is estimated that surplus production of beans and pulses durng the year approached 1,000 tons taking into account direct sales to sisal estates and such like, whereas the recorded figure shows 467 tons only as having come on to the market. Production of mixed pulses in the Central Province increased appreciably over that of previous years. Aside from the excellent season as a contributing factor to this increase it is interesting to note that in the Kondoa area (which contributed 305 tons of the total provincial output of 551 tons) the people of Usandawe and Burungi made use of the issue of various legumes provided as famine relief for extensive planting of pulse crops. The Handeni District of the Tanga Province, an area which in the past frequently suffered from food shortages, this year produced a substantial surplus of some 200 tons of pulses.

The Southern Province exported no less than 4,976 tons of its excellent crops of pulses of which 8,420 tons are recorded as having passed through the produce markets. White haricot beans yielded 75½ tons in the Kasulu District of the Western Province and in the Northern Province 33 tons were bought by the Control.

Production sold through Produce Markets

Province	Mixed Beans	Haricot Beans	Chick Pea	Cow-peas	Grams	Pigeon Peas	Soya Beans	Bam-barra	Bona-vist (Fiwi)
Northern	720	33	—	—	—	—	—	—	—
Tanga	448	—	—	15	—	—	—	—	—
Central	20	—	—	—	4	—	—	—	—
Lake	446	—	1,816	1,609	88	—	213	4·0	—
Southern	309	—	2,925	2,626	797	700	—	968·0	95
Western	157	31	—	1	5	18	—	0·5	—
Southern Highlands...	—	—	—	*385	—	—	—	—	—
Eastern	105	—	—	81	16	22	—	—	—
Total ...	2,205	64	4,741	4,717	910	740	213	972·5	95

*Peas and pulses combined.

Vegetables and Fruit

The production of vegetables, though on the increase, particularly in the Iringa District of the Southern Highlands Province, is quite inadequate to meet the demands regularly throughout the year. The requirements of the Ground-nut Scheme at its four scattered centres of operation alone amounts to more than half the previous normal production and this quantity added to the ever increasing consumption in Dar es Salaam and the mines in the Western and Lake provinces will necessitate considerably more attention to vegetable

growing than before. The main centres of production continue to be the Usambaras and Uluguru mountains and the Kilosa and Iringa districts. From the former three areas transport is by road and rail but a considerable proportion of the Iringa production is transported by air, including that to the Southern Province for consumption by the Overseas Food Corporation and associated organizations and to Williamson's Diamond Mines in the Lake Province.

During the first three years of organized marketing under an agent the Muheza citrus industry relied very largely on the purchase of fruit by the War Supplies Board in Nairobi and marketing did not present many difficulties. The board did not purchase this year, however, and the industry had to rely entirely on commercial selling. The disposal of fully ripe and overripe fruit in the form of juice was developed during the year and a "Pilot" juice extracting plant was installed at Muheza in time for the fly crop at the end of the year. Three thousand and twenty gallons were produced and sold to Kenya and advance orders for 1948 already amounted to 4,000 gallons.

Banana production in the Kilimanjaro area which suffered a severe setback in 1946 because of very unfavourable weather was restored as the result of excellent rains during the latter part of 1946 and the early months of 1947 and ample supplies became available.

SECTION II.—DETAILS OF ASSISTANCE AND PROGRESS

The organization of the field extension activities of the department continued in each of the eight provinces under the direction of a Senior Agricultural Officer, whose report in respect of his area is included as an appendix. Details of the European staff is given as appendix I.

Besides sixteen Asiatic clerks the Department employed the following African staff:—

4 African Agricultural Assistants.
2 Coffee Grading Assistants.
100 Recorders, Local Civil Service.
16 Artisans, Local Civil Service.
403 African Instructors, Local Civil Service.
505 African Instructors (War Production Staff).
21 Laboratory Assistants, Local Civil Service.
46 Overseers, Local Civil Service.
20 Motor Drivers, Local Civil Service.
38 Clerks, Local Civil Service.
40 Messengers.
28 Instructors Local Civil Service (Copra Industry).

Tanga Province

The two major development projects in this province, namely the Mlalo Rehabilitation Scheme in the Western Usambaras and the Luengera Irrigation Scheme have both progressed satisfactorily during the year. The former, which was started in 1946, was reorganized so that the control of the numerous branches of work involved could be better co-ordinated. The scheme was therefore placed under the single control of the Senior Agricultural Officer. He is directly responsible to the Provincial Commissioner who acts as chairman

of a provincial committee composed of the various technical officers concerned with the scheme. Considerable advance has been made with the village survey part of the project and already valuable information has been collected. Not the least of the difficulties has been the winning of the confidence of the people in the area. Much headway has been made in this direction and future progress should be more rapid as a result.

The second survey in connection with Luengera Irrigation Scheme, details of which were given in last year's report, was nearly completed during the year. As a result of the work so far completed it has been established that a furrow on the left bank of the river can be made to serve an area suitable for rice growing of which there are conveniently situated some two or three thousand acres in one block. In order to determine what acreage of land under rice the available 25 cusecs of water will maintain, the excavation of a small pilot furrow was started towards the end of the year to irrigate a trial plot of 100 acres*. Once this information has been collected work will start on the preparation of the main area and furrow.

The installation of a juice extraction plant at the Muheza citrus packing plant was made possible by a loan to the Native Treasury No. 2 account from the Development Commission.

The very valuable work in connection with trials of imported seed of blight resistant varieties of potatoes was continued throughout the year and new introductions were made. As the result of blight, potato growing in the Usambaras has declined in the last few years from a thriving industry with an export of approximately 1,000 tons to one with less than 50 tons available for sale. A number of the introductions are showing promise under local conditions and multiplication of the most suitable varieties will be made shortly.

Of particular note is the improvement in food production in the province. The year produced some of the largest yields for many seasons. Particularly was this the case in the Handeni district where production taxed transport and storage facilities to the utmost, in fact, after exporting 3,000 tons of maize, as well as other commodities, a halt had to be called until extra facilities could be provided. The areas planted to root crops showed a vast improvement over previous years.

Northern Province

The erection of fourteen grain silos at various points in the Mbulu District was commenced during the year. Every taxpayer is required to contribute a quantity of his grain harvest towards the filling of these silos. Once filled there will be in existence a most valuable safeguard against famine.

A satisfactory start was made with the native settlement scheme at Mbulumbulu and additional land, formerly farmed by the Northern Province Wheat Scheme, is to be taken over.

The first six units at Oldeani were given out to six non-native settler applicants. The beginning of a new settler community has therefore started which will increase as further farms, now being operated by the Custodian of Enemy Property, are released for allocation to settlers at the end of 1948.

* The object is not one of complete irrigation but the provision of a supplementary and certain source of moisture to augment the rainfall during periods of dry weather, thus ensuring a crop.

Progress was made at a number of the Coffee Propagating Centres in the Moshi District in their preparation for the planting of trial plots and mother trees but shortage of clonal planting material is likely to retard headway. Two centres had to be abandoned because they were found to be unsuitable.

The buildings at the Coffee School, Lyamungu, are ready for occupation but teaching staff remains to be obtained.

Onion culture experiments were continued during the year mainly in connection with the use of sulphate of ammonia on the crop. Rate and time of application combined with spacing and planting were studied. Some significant results were obtained which will be published elsewhere when their analyses are completed.

Wheat production suffered in the Northern Province because the main rains were too heavy and protracted for successful wheat growing. Varieties susceptible to leaf rust suffered very severely. On the other hand conditions in the main proved more favourable to maize and the largest crop on record was produced of which 124,454 bags of surplus grain were sold to the Control. The previous record totalled 102,001 bags in 1945.

Papain yields decreased markedly as the result of lack of sunshine and dull conditions following the heavy rains and plant growth was retarded. Nevertheless, with the high prices in the early part of the year which later dropped to between Shs. 20/- to Shs. 17/- the 108 tons of papain exported yielded over a quarter of a million pounds in value.

The seed bean industry also received a setback because of the heavy and prolonged rains which caused a high incidence of disease with consequent higher proportion of reject beans than usual. Yields were very disappointing as well. On the other hand, the coffee crop was a bumper one, the trees on most estates throughout the province setting one of the heaviest crops on record.

Trials to regrass the Moshi aerodrome were continued but the results were disappointing.

Progress with soil conservation works was maintained throughout the province. A concentration of two dozen levellers was made in Rombo for work mainly in newly opened areas. The demarcation of the upper limits of cultivation on steep hills in the Arusha District was started and the necessary legislation passed. As a result the progressive upward advance of cultivation into the forest areas should now come to an end. The closing of cultivation on or near very steep places, such as river banks and ravines, is included in this work. Less spectacular results have been achieved in the Mbulu District where in some areas the people continue to be apathetic and are unwilling to appreciate the necessity of protecting their soil. In others, however, the response was most satisfactory and considerable advances were made with schemes during the year.

Regeneration trials of over-grazed, eroded land in Rombo were carried out during the year with encouraging results. They are to be continued and enlarged.

Routine measures and investigational work only were carried out as a beginning to the project for the rehabilitation and introduction of soil conservation measures in the eastern sector of Kilimanjaro—Mwika to Usseri.

Plans were approved and funds allocated from the Colonial Development and Welfare Fund during the second half of the year for the development of the Mbulu District. Preparatory work only such as house building, collection of materials and instruments, was attempted and the initial surveys and field work will begin early in 1948.

Southern Province

The Southern Province experienced one of the biggest harvests for many years so much so that marketing and transport facilities were taxed to the utmost. In fact by the end of the year there was still surplus produce in the province awaiting evacuation in spite of the big influx of consumers in the form of personnel connected with new harbours, road and railway construction works. An opportunity was provided, however, for an examination of marketing and transport facilities throughout the province from which it should be possible to bring about an improvement in future years. The lack of bags proved a serious obstacle to orderly marketing and lack of storage space resulted in considerable losses when the early rains fell.

The resettlement of the Liwale District inhabitants to the north of the Liwale boma in the new settlement areas of the Kilwa District was completed during the year. Work on the Mahiwa Rice Experiment Station continued during the year. Good headway was made with the building programme and a small herd of dairy cattle was added.

Southern Highlands Province

No particular development schemes were introduced during the year but good progress was made in general agricultural activities.

In the case of native agriculture the main points to record are:—

(a) The increase in the area planted to rice and the improvement in acreage yields compared with previous years. On the other hand natives still persist in favouring the broadcasting of seed in spite of the knowledge that transplanting yields greater crops. The standard of cultivation has improved, however, and most cultivators now use the plough.

(b) Wheat growing is gaining in favour particularly in the higher altitudes. The growers are consuming most of their production of this crop.

(c) There is a noticeable improvement in the maize being offered for sale. This is largely due to the issue of selected maize seed. It is estimated that forty per cent of the maize marketed during 1947 was of better quality.

(d) The production of eleusine, mainly for brewing beer in the usual native fashion, is most destructive of vegetation and is an important factor in promoting erosion. Efforts have been made to encourage the use of a less destructive but equally effective method of growing the crop and in the Iringa District such a method was enforced during the year by a Native Authority order. Results were not spectacular but a start has at least been made to conserve natural vegetation and reduce erosion yet provide the grain.

Non-native agriculture experienced a good year. The tobacco crop yielded well although in its early stages it suffered somewhat from too much rain. Satisfactory results were obtained with the new variety introduced, namely "Ehlers". It is a heavy yielder and appears to be liked by the buyers. In

all some 2,100 acres were planted yielding a crop of 749,389 pounds. To handle the expected increase in production in future years work started on extending the grading shed for which purpose a loan of £13,000 was obtained by the Non-Native Tobacco Board from Government. The higher prices ruling for tobacco during the year attracted many planters who had left the district in 1946. Sixty-nine applications for farms were made but for various reasons this number could not be dealt with. Eventually six of the applicants were selected and allotted farms in the Nduli and Mlola areas on the understanding that they are to be regarded as experimental for the first year.

The uncertain future caused some planters to dig in their pyrethrum and plant other crops. Others continued to deliver in the hope that they would ultimately get a suitable price and nine planters accepted the Board of Trade's offer of compensation for going out of production from June to December.

Although rainfall was above average the tea crop suffered because the months of June, July and August which are usually misty and damp, an essential condition prelude for good yields in the main cropping months of October to March were unusually dry and sunny. Particularly was this so in the Mufindi tea area. The August and September showers, a feature of the area, also failed. The net result was an appreciable reduction in yields towards the end of the year.

Vegetable production is becoming an important feature of the agricultural activities of the province, especially in the Iringa District. Increasing quantities were exported to the Groundnut Scheme at Kongwa, the Diamond Mines near Shinyanga and to Dar es Salaam an appreciable portion of which was transported by air.

Satisfactory progress is reported in the matter of soil conservation measures throughout the province both in native and non-native lands. There is nevertheless much room for improvement but it can be said that while a few years ago the native cultivator took no interest today it is rare to see a plot without some evidence of erosion control measures.

Renewed interest taken in pig production centred mainly in the Iringa District. The Southern Highlands Farmers' Association agreed to take over the bacon factory at the request of the newly-formed Pig Growers' Association and Government made a "grant in aid" of £2,000 to assist in repairing and extending the factory. The factory began operating before the end of the year and small quantities of its products were exported to the United Kingdom.

Eastern Province

In the Eastern Province the year was a good one, the considerable period between the cessation of the short rains of 1946 and the beginning of the main rains of 1947 affording growers ample opportunity to prepare their plots for planting. Favoured by well-distributed rains the yields of food crops were good. The production of 6,600 tons of maize by non-natives was very satisfactory and was derived mainly from sisal estates in a praiseworthy endeavour to make a contribution to the feeding of their own labour.

The cotton crop proved a disappointment for, despite an increased acreage, attack by American bollworm reduced the potential heavy crop to one of the same dimensions as that of the previous year. Insect pests thus continue to be the factors dominating expanded cotton production in the province.

The potential yield of palm areas is greatly reduced by neglect of maintenance of many of the plantations and by the picking of immature nuts.

The coconut crop was not a good one. Measures to improve the care of coconut plantations were continued under Native Authority Plant Sanitation Rules in Bagamoyo, Uzaramo and Rufiji, with satisfactory results in Bagamoyo and Uzaramo.

With a growing appreciation of sugar and a fairly static production of the plantation grade, the cultivation of sugar cane and the production of jaggery has expanded considerably in the province and fills a needed want.

Arrangements were made in co-operation with the Entomologist to inspect maize delivered for sale to the Produce Control to ensure that it was adequately dry. Thereafter the bags were dusted externally with 0·5 per cent Gammexane and stacked in godowns which had been previously cleaned. The results have been satisfactory as, after five months, 21 per cent of the bags contained a considerable number of weevils, 42 per cent contained only a few weevils and 37 per cent contained no weevils. The 21 per cent described above was still fit for human consumption and was in better condition than normal trade maize.

Ten Native Authority soil conservation instructors were given an intensive course in soil conservation methods and put to work in strategic areas where their efforts will be observed later. One instructor was transferred to the Bigwa Teachers' Training Centre, near Morogoro, to teach elementary agriculture and soil conservation to the senior classes. This is a development which should prove of great importance in the future and which will be extended as staff becomes available.

Western Province

The Western Province experienced a good year for food crops and substantial export surpluses of most crops were marketed. As is frequent in good food years, there was a drop in the collection of gum and honey and beeswax. Apart from the reduction in collection the reduced flowering in certain tree species the previous year due to lack of rain decreased the laying down of wax and honey.

The start made at Kigoma in 1946 to revise interest in the marketing of palm kernels has met with success and 207 tons of kernels were bought compared with 17 tons in the previous year.

An issue of sunflower seed was made to growers for trial during 1947-1948, and 10½ tons of seed were distributed in the province.

Anti-erosion and water conservation measures continued to be taught by departmental instructors in the scheduled areas of Nzega and Kahama districts. Ten earth dams to provide water to facilitate rice growing were completed during the year and two more were under construction.

The campaign for the full use of pen manure and for increased production of manure was continued. Most of the available cattle manure is taken to the fields, but there is resistance to the provision of trash, etc., for the making of additional supplies of manure. Until the method of transporting this material to the fields ceases to be by the head load, there is likely to be continued opposition to production of more manure. A number of steel wheelbarrows were sold to Africans for manure transport.

Central Province

The Central Province is frequently dominated by the threat of hunger and at the beginning of the year the distribution of food for famine relief was a major consideration. The abundant grain harvests put the province in a better position than it has been for the previous five years, and at the end of the period 104 district grain silos owned by the native administrations contained approximately 6,000 tons of grain reserves.

Groundnut production, although modest, was the best in five years, and onions produced in the Singida area alone reached a record total of 342 tons.

Gum, beeswax and honey are regular cash products of the province. There was a substantial drop in gum collection but a marked increase in wax and honey sales during the period.

Castor seed has been greatly stimulated by an internal price of 35 cents per kilo. There is a danger that this may interfere with grain production.

A considerable programme directed towards soil conservation by contour banking has been carried out during the year, this work being confined to the repair of old banks in the Dodoma District. In other districts, however, over one thousand miles of new banks were demarcated and constructed. It cannot yet be said that the cultivators, if such they may be called, are enthusiastic about these measures.

The advent of sleeping sickness in the Kondoa area, the work of enlarging perimeter defences around the central tsetse-free block of the Singida-Mkalama district, and the necessity to clear an area of some thirty-two square miles to protect the important Bahi depression from invasion by fly, have made very considerable calls on the manpower of the province.

The limited experimental and demonstration programme on the tribal seed farms at Dodoma and Singida was continued. The yields of grain in these lands which are neither cultivated nor manured beyond the capacity of the local population to accomplish, are invariably higher than those on surrounding native plots.

Lake Province

The Lake Province had a good year for food crops but the cotton crop was below average. Progress was made in Musoma District in the provision of stores for grain reserves held by the people in their own interests, but in the province as a whole this development needs further attention.

In these areas of recurrent grain shortage a quick maturing good keeping sorghum of good eating quality would be invaluable. Planting material of improved rice strains and of cassava resistant to viruses is being distributed and, amongst export crops, better high yielding cotton is being bulked for wider distribution. A limited issue of sunflower seed was made for trial in the province.

In the Ngara and Biharamulo areas attention was concentrated on cultivation and curing of tobacco, in thinning and mulching of bananas and on pruning and mulching of coffee.

There has been some general advance in the practice of tie-ridging for the conservation of soil and water, but the rate of advance is slower than the needs of the situation.

During the period an advance has been made in the approach to the problems of land used by provincial officers who give full consideration to all the aspects of the problem in association as a team. This tends to ensure that all technical considerations are put in proper perspective in relation to general development requirements.

The team has devoted much time to fact finding in relation to areas of undeveloped lands and to the important tasks, in these comparatively arid regions, of finding sources and sites for water points, and a considerable amount of Sukumaland has now been mapped.

A beginning was made with the Development Centre and Federation Headquarters at Malya during the year, and in the Shinyanga District a start was made in the areas of Busiha and Bududhi where a large number of cattle were moved out during the dry season and grazing reserves demarcated. Grass strips are to be included in all fields of "ibushi" soil and tie-ridging to be practised in fields not planted dry.

The advent of an education officer to the Instructors' Training Centre at Ukiriguru is resulting in an improvement in the method of instruction, but the teaching staff is not as well equipped with technical agricultural knowledge as is desirable. Notwithstanding its shortcomings, which can be corrected, the training received by the instructors is in advance of anything that it has yet been possible to provide.

District demonstration plots laid out on the basis of a three years' rotation of cotton, grain and groundnuts, followed by a grass ley have been maintained by instructors at forty centres in Sukumaland and have been on the whole successful.

During the period the Bukoba Native Coffee Board was vested with the power to become the sole purchaser of native produced coffee in the district and has entered into a five-year contract for the sale of a large part of the crop. The district has been divided into zones each with a buying agent and fixed prices have been proclaimed for the season. It is proposed to provide a coffee hullery in each zone and subsequently to forward the dry raw coffee for cleaning to Bukoba.

Much wasteful competition which tended to encourage the production of low grade coffee should now be eliminated and standards of preparation and of cultivation of the coffee crop raised by the activities of the Board.

Experimental Work

Lushoto Farm.—Details of the work carried out on this farm are contained in annexure II to the annual report of the Senior Agricultural Officer, Tanga Province (appendix No. XI.) The main work on the farm during the year was the testing of potato varieties received from the Scottish Plant Breeding Station. Fifteen Scottish varieties or strains were under test including seven new ones imported during the year. The object of this work is to isolate a variety or varieties which show immunity or at least a high resistance to Irish Blight (*Phytophthora infestans*) and which can then be multiplied and distributed for commercial production. Of the original eight varieties three were discarded during the year as being unsuitable for further trial. In addition other varieties susceptible to *Phytophthora infestans* were planted to maintain a source of infection.

Pangani Coconut Seedling Nursery.—One thousand and sixty-one selected coconuts were planted at Boza near Pangani. The parent palms have been under observation for five years and regular yield accounts maintained.

Wheat Experiments.—No wheat experiments were carried out in the Northern Province during the year but it is worth noting that whereas most varieties usually grown failed because of their susceptibility to stem and leaf rust, the latter being particularly bad because of the very wet season, two of the newer hybrids imported in 1946 from the Kenya Plant Breeding Station and which gave promising results in last year's trial, gave good results this year in spite of the adverse conditions for wheat. These two hybrids are strains of "261" and being hard wheats are valued for blending purposes. Four strains of "294" also grew successfully but are not so much sought after as the "261" strains. A small scale trial with four varieties was laid down in the Njombe District of the Southern Highlands. This was essentially of a preliminary nature and to obtain information on the best planting time for the area.

Tobacco.—Trials were continued with *Nicotiana rustica* at four different points in the Southern Highlands Province under varying altitude and climate conditions. Seed germination was satisfactory and good stands obtained but the yields of leaf and nicotine proved disappointing. These trials are not to be continued.

Flax.—Trials were continued from last year on ten plots at six different sites in the Southern Highlands Province. Details are contained in the annual report of the Southern Highlands Province, appendix No. VIII.

Linseed.—Seed of three varieties were received from Canada and the United States of America at the instance of the Colonial Office. The seed arrived too late for planting during 1947.

Southern Highlands Ripping Trials.—During the year there has been no outstanding vegetative change in species or in plant vigour. At Mufindi the ripped plots showed a decrease in vegetative cover but these plots kept green longer and became green quicker than the neighbouring grass lands. On the Dabaga plots annual weed growth has increased on the ripped areas and these plots showed a thinner grass cover than the control and unripped. The Rungemba plots showed a decrease in the cover on the ripped plots but an increase in the annual weed growth.

Mahiwa Rice Station.—In comparison with the difficulties caused last year by drought, a heavy flood this year washed out the dam built in 1946 for irrigation of both the farm and native lands below. This did not hamper the work of the farm but the heavy rains masked somewhat the comparative results of the station plantings and those on the neighbouring lands.

Spacing trials again gave inconclusive results due in part no doubt to the marked variability within plots caused by the levelling of the land, but the eight-inch spacing tended to give the best results. This spacing was used throughout the other experiments. In the transplanting versus broadcasting experiment the best results were obtained on the contour plot.

Two hundred selections were made during the season based on vegetative appearance, tiller counts and weight of grain. These have been reduced to twenty selections which have been retained for further treatment.

A collection of grasses found on the experiment station was made during the year.

Two thousand three hundred and fifty oil palm seeds, obtained from the Belgian Congo, of the Kangala, Liscombe and Deli types were planted in the station nurseries. Germination was excellent.

Twelve Boran cows and one calf were received from the Veterinary Department at the end of the year. These animals will form the nucleus of a herd to be developed on the station.

Development on the station included the building of thirteen labourers' houses, a two-roomed dairy, a battery of ten grain bins primarily for the use of the Tanganyika Railways. With a capacity of 100 tons these bins will be handed over to the department when no longer required by the Railways.

Onion Experiments.—The experiments conducted during the year at Moshi were mainly in connection with the use of sulphate of ammonia for yield increase: rate and time of application combined with spacing distances. Similar results were obtained to those reported last year. Efforts to produce onion seed locally in the Mbulu District have been hampered seriously by onion thrips and experiments were carried out during the year on the control of this insect pest. Of the various sprays used DDT/Oil Emulsion (1 : 25) gave the most promising results in addition to which the foliage of DDT treatment plots was outstandingly better than that of any other plot and growth persisted for about three weeks after the other plots had ceased growing. Other spray materials used were: Diesel Oil/Kaolin Emulsion, Agrocide 3 (1 : 300) and Neocid (1 : 150). The last mentioned appeared to have some value, but did not compare with the DDT spray.

Regrassing Experiments.—The experiments started last year on the Moshi aerodrome at the request of the Director of Civil Aviation were continued during 1947. Results were disappointing and not of great value. Only one grass—"Uru grass"—a fine strain of *Cynodon dactylon* proved satisfactory in habit. It has, however, still to prove itself sufficiently drought resistant and able to stand up to the competition of other tougher grasses. The other grasses—listed in last year's report—on being mown left sharp stumps quite unsuitable for landing aircraft.

Regeneration : Rombo.—In the Rombo area of the Moshi District a trial to regenerate grass cover on over-grazed land was laid down. Most satisfactory results were obtained even within one year but the trial was marred by the sight of grass being too great a temptation to some of the inhabitants who opened the thorn hedge and let in their cattle. This trial is to be continued and increased in scope.

Morogoro Farm.—Work on the farm was limited to the maintenance of varieties of crops including cassava, sweet potatoes, short term sorghums and bananas, the provision of ocular demonstrations of improved cultural methods, sale and distribution of planting material and the supply of fresh milk to the European community of Morogoro.

From the fruit tree and ornamental nurseries over 6,600 plants were supplied to many parts of the Territory and from the farm considerable quantities of seed and other types of planting material of food and economic crops were distributed.

In the cassava variety trials twelve Amani varieties were maintained and continued to show a greater resistance to Mosaic and Brown Streak than the local variety. One variety, Amani 4026/20 appeared to be completely immune.

The alternate husbandry trial comprising three years arable—maize or sorghums—followed by three years under grass continued to give most significant results even in its third year of cropping. Maize yields in particular were appreciably greater than the average non-native yields in the district. No irrigation or applications of manure had been applied.

Sisal Experiment Station, Mlingano, Ngomeni.—A full annual report from this station is published separately. It contains the detailed description of the layout of a large series of experiments and the yields of treatments recorded during the year. Experimentation on a long term crop such as sisal in which the second or third cycle of planting is at least as important as the first does not lend itself to summary treatment and the notes which follow are of a general nature.

During 1947 the total rainfall amounted to 42·04 inches which is about five inches below the average for Mlingano. The rainfall distribution was more satisfactory than in the previous year since 142 rainy days were recorded. The main rains approximated to the norm but the small rains were rather delayed, most rain falling in November and December. Weather during the cool season tended to be overcast and dry.

The year 1947 will be memorable for an exceptionally bad outbreak of the sisal weevil (*Scyphophorus acupunctatus*) which was responsible for the uprooting of two new trials and considerable losses in others thus detracting from their uniformity. Drastic measures were called for since the weevil threatened to make it impossible to carry out field trials satisfactorily at Mlingano. Mention has already been made of the removal of a senescent plot of blue sisal and many thousands of hybrids and it is hoped that in due course the weevil population on the station will be greatly reduced. Poling sisal plants were destroyed as early as possible and all young sisal was protected by dusting with insecticides though the weevil continued to breed below ground level in the boles of small plants. The weevil problem has been the subject of further investigational work on a limited scale in collaboration with the Entomologist, Morogoro.

Selection of the agave hybrids comprising mainly back-crosses of *A. amaniensis and A. augustifolia* was continued during 1947, all unsuitable plants being destroyed and now there are about five hundred left. Some of these plants poled and further pollination work was carried out. The unsuitable types proved either susceptible to disease or possessed massive leaf bases which provided prolific breeding grounds for the sisal weevil and their removal became essential in the interests of other experiments.

There are three external spacing × cutting trials respectively sited at Rudewa and Kingolwira on the Central Line, and at Amboni in the coastal belt in the Tanga District. The Rudewa trial was the most forward and a first cutting was taken from certain of the plots in March 1947 according to the schedule of cutting treatments, but the Kingolwira trial was not ready at the same time and the initial cut had to be postponed until June, or twenty-seven months after planting. The Amboni trial, replanted in 1946, will not be ready

for cutting until 1948; owing to weevil attack the sisal is not very uniform. A new 3 × 2 × 2 silico-phosphate manurial trial was planted on one estate in the Tanga District on a site where banding disease is severe.

In his review of a cultivation trial planted in 1941 which includes: (1) continuous clean weeding; (2) weeding twice annually; (3) cover crop; (4) weed cutlassing; and (5) uncontrolled weed growth, the Senior Research Officer points out that the clean weeding treatments poled out much earlier than the others and that the second cycle in these plots is now almost complete whereas the plots with uncontrolled weed growth were only replanted in their second cycle in 1947.

The clean-weeded plots have thus given the largest and most rapid return within the period 1941-47. The Senior Research Officer, however, states it would be dangerous to infer from the trials that continuous clean weeding is best for sisal and notes a decline in sisal yields in the second cycle and a deterioration in the organic matter content and texture of the clean-weeded soils contrasted with those on which weed growth was uncontrolled. He suggests that in the continuously clean-weeded plots the soil has been sacrificed for the sake of the sisal, and in the plots of uncontrolled weed growth that the converse applies.

A treatment which will provide a minimum of weed growth in competition with young sisal together with soil protection provided at a later stage, appears to be called for.

With better seasons and facilities for watering, a considerable expansion of the citrus nurseries was made in anticipation of future demands. Over 15,000 stocks were transplanted and the majority were budded in 1947. Through intensive methods it is hoped that a large number will be ready for sale next year. A total of 2,186 citrus trees were supplied to sisal estates and others during 1947. Sales of citrus fruit continued.

Over 100 members and guests of the Tanganyika Sisal Growers' Association attended a successful Planters' Day held at Mlingano on the 7th July 1947. Visitors were shown round the experiments and a comprehensive display of diagrams and exhibits illustrating the results of past experimental work was prepared.

Cotton.—Cotton experimental work during the year was continued under the charge of three officers of the Empire Cotton Growing Corporation on the stations situated at Ukiriguru and Lubaga in the Lake Province, and Ilonga in the Eastern Province. In future the Lubaga Station, in its experimental aspect, will continue as a sub-station of Ukiriguru and will be under the supervision of the departmental District Agricultural Officer, and the Empire Cotton Growing Officers in the Lake Province will be resident at the Ukiriguru farm. Considerable development work was undertaken at Ukiriguru and Ilonga and a big building programme is in hand at both stations. At the former station about 350 acres of land, 300 of the popular "hill-sands" series and 50 of the heavy black "mbuga" type, were added to the farm and will add greatly to its effectiveness. Cotton yields were good although variable. Jassid damage partly offset the good growing conditions in the north, while in the south, at Lubaga, American boll-worm damage was severe. Water-logging affected crops in the heavy black valley-bottom soils and black-arm was present at all

centres. High yields were obtained on some of the district plots which escaped insect damage and two plots at Nassa both averaged more than 1,400 pounds per acre seed-cotton over large strain trials.

Bulking of the new strain mixture U.K. 46 was made. At the same time it was tried out for the first time as an entity and came fully up to expectations in the field. U.K. 46 has been developed to replace the present commercial cotton of the Lake Province, Mz. 561. In seed cotton yields, U.K. 46 averaged 25 per cent better than Mz. 561 over seventeen strain trials at stations and district plots. In terms of lint the increase is even more satisfactory as the ginning percentage of U.K. 46 (average of six trials) was 34·1 per cent as compared with 32·8 per cent of Mz. 561. Spinning results are not yet to hand but it is considered that in this respect U.K. 46 will resemble closely Mz. 561. A marked resistance to jassid has been achieved in this strain as was particularly noticeable in the field but it lacks resistance to black-arm. In the next issue of seed contemplated special attention is to be given to black-arm resistance, in fact work has already started in this direction in the breeding of the strain U.K. 48.

The U4 × Sea Island crosses appear at last to be settling down to local conditions and the best of the local selections will go into the trials next season.

The studies on the maintenance and restoration of soil fertility were continued at Ukiriguru and Lubaga, and included manurial as well as land resting trials. The seven-ton-per-acre dressing of farmyard manure maintained its beneficial residual effect in the third and fourth year. After three years under cotton the residual effect of this dressing was still of the order of 38 per cent increase over the control. In the case of another trial, under grain, a fourth year effect from 7 tons of organics was still appreciable at around 28 per cent. An effect was also discernible from the heavy dressing of 3 tons of cotton seed ash. In the N.P.K. trials the effect of nitrogen was large, of phosphate small and of potash negligible. A green manuring treatment gave a big increase on the grain constituent of a grain-interplanted-legume crop, but at the expense of a corresponding drop in the legume constituent.

In last year's report it was stated in connection with the land resting trials at Ukiriguru: "*It would appear that no benefits from the resting crop treatments have carried over into the second year of the cropping cycle.*" The results of the trials this year indicate that the provisional conclusion that the benefits from a three years' grass rest had been dissipated in one year's cropping at Ukiriguru, on light land, needs modification for a significant benefit has reappeared in the third year after apparently skipping the second. No definite explanation of this can as yet be offered. It may be that cotton, the crop under which most of the rest-crop trials happened to be in 1945-46, is a poor indicator crop, or it may be because of the marked difference in the two rainy seasons. The fact is that the 1946-47 grain indicator on these same trials showed a significant benefit. Referring to the elephant grass rest treatment, this, compared with the control treatment of continuous millet, showed an increase of 38 per cent in the first cropping year, a negligible increase in the second year with a 34 per cent increase in the third year. In two further trials just broken out of the three years' rest, elephant grass and pigeon pea treatments were usually around 40 per cent ahead of the continuous millet control with pigeon pea rather the better of the two.

Tie-ridging continued to prove of value to yield even in a year of heavy rain and crops did not suffer to any great extent from water-logging. On the Ukiriguru hill-sands tie-ridging put up the yields of cotton by 50 per cent over ridges made native fashion without tieing, but a sister trial under a grain crop showed no significant difference between the two treatments. At Lubaga tie-ridged groundnuts on the heavy soils of that station yielded a significant 24 per cent better than crops grown on the flat, tie-ridged cotton also was the better but bulrush millet showed a non-significant depression from being grown on tie-ridges. The control of erosion in this year of heavy rains indicated more than ever the benefit to the land of this method of cultivation.

Work at the Ilonga Station near Kilosa continued to be largely in the nature of preliminary development, mapping and choosing building sites. Building work was started but progressed slowly on account of lack of materials. One hundred and twenty acres of new clearing was planted and the old lands allowed to return to bush fallow.

Experimental work consisted of variety and strain trials. The latter were so devastated by boll-worm, rats and millipedes as to render them valueless. The variety trial of four commercial strains tested against M.U. 8A was discontinued, as over a period of four years at Ilonga and on six district plots the object of this trial had been proved, namely that in the face of insect attack a productive type like M.U. 8A was capable of giving a better crop than Eastern Province local and other types possessing similar characteristics.

In spite of millipede damage the final yields from the single plant trials proved excellent and it was possible for the first time to obtain combed lint lengths. These showed a tendency for lint length to be short in high yielders but a number of the highest plants had very satisfactory lengths as was the case in some of the selections from Barberton Sea Island × U4 crosses.

Continuous records of the principal pests were taken throughout the season at Ilonga and on the four district plots. Plant development records were also taken in conjunction with these.

Mwanhala and Tumbi Agricultural Development Centres, Western Province.—Development work on the two centres was continued and included erection of buildings, clearing land, road making and dam building. The area planted to crops at Tumbi amounted to 58 acres and at Mwanhala 96 acres. A successful and well attended agricultural show was held in July at Mwanhala.

The land resting trial reached its third and last year under rest and the plots will be broken up for planting in 1948. No significant results were given by rock phosphate in the manurial compost and rock phosphate trial which was in its second residual year. Similarly the ridge cultivation trial gave no isignificant results. This is thought possibly to be due to the exhausted fertility of the soil and it is therefore proposed to repeat this experiment on the same land after an overall treatment of 6 tons manure per acre.

Early observations in the silicophosphate experiments both at Mwanhala and Tumbi showed that definite increases in production had resulted from applications of silicophosphate 2 and 4 cwt. per acre alone and with 1 cwt. sulphate of ammonia added as compared with the control plots and the sulphate of ammonia 1 cwt. per acre plots. In the farmyard manure experiment maize yield was substantially greater with three tons of farmyard manure per acre than with one ton per acre.

Seed production for distribution was an important item in the farms' activities: Tumbi sold approximately 9 tons of seed and 10,000 cuttings of cassava were distributed. Mwanhala produced 21 tons of seed of various crops for distribution and continued to act as a supply centre for the resale of agricultural tools and implements. This service is increasing rapidly. The tools handled include ploughs, plough shares, yokes, chains, wheelbarrows, picks and shovels and various other small hand tools.

Coffee Research Station, Lyamungu, Moshi.—The annual report on the coffee experimental work carried out at this station will be published separately, following the usual custom. It will contain a detailed description of the experiments and the year's results together with full statistical data.

The Senior Research Officer in his interim report states that following a virtual failure in the 1945/46 season a very heavy crop was set in the 1946/47 season. A total crop of 53 tons parchment coffee was harvested from 82 acres; of the 82 acres some 15 contained coffee of four years old or less.

Coffee grown on the multiple stem system continued to yield at a significantly higher rate than that grown on the single stem system. Over a period of nine years, 75 per cent more coffee has been reaped from trees grown on the multiple stem system.

Results from experiments in which various mulches are used indicate that the lighter applications (40 lb. per tree) are equally as effective as the heavier applications despite the fact that these latter afford an effective cover for the soil for a complete year whereas the former have ceased to give a cover by the time the dry season sets in.

Over a period of six years no advantage has been obtained by using sulphate of ammonia in conjunction with the heavier applications (80 lb. per tree) of mulches, nor has the application of sulphate of ammonia on unmulched coffee shown an increase in crop.

In the fertilizer experiment in which sulphate of ammonia, nitrochalk and ammonia nitrate are applied at different times in the year and in varying quantities, no differences between the general effects on yield of the three fertilizers have appeared. The treatments have been applied for two years only, 1946 and 1947.

Over a period of six years light irrigation (rainfall made up to two inches monthly) has increased yields very substantially, an increase in the irrigation (rainfall made up to four inches monthly) gives no additional increase in yield. A combination of light mulching (40 lb. per tree) and light irrigation gives a substantial increase over the yield obtained from light mulching or light irrigation treatments separately applied.

It appears that mulching and irrigation in combination may be a factor in limiting the extent of biennial bearing, there is also evidence that a genetic factor or factors may also be involved in biennial bearing.

The comparison of the yields of clones and seedlings has been in progress for three crop seasons, the clones have given a higher crop (22 per cent over the period). No conclusions can yet be drawn from the results so far obtained.

Three trials of clonal material were planted up on estates and one on the Moshi Native Coffee Board plot at Kibosho.

The trees in the clonal selection trials yielded well and also set a fair crop for the 1947-48 season. The coffee produced by these selections proved very satisfactory in respect of size of bean and liquoring quality.

Approximately one ton of seed from the various coffee selections was sold to growers.

Council, Boards and Committees

The Director of Agriculture and of Agricultural Production was also Sisal Controller. As well as being a member of the Executive Council and of the Legislative Council, he is chairman of the Sisal Board, the Cotton Board, the Tea Board, the Coffee Board, the Sisal Experiment Station Management Committee, the Coffee Research Station Board of Management, and the Songea District Native Tobacco Board. He is a member of the Railways and Ports Council, the Labour Board and the Editorial Board of the East African Agricultural Journal, and remained a member of the Economic Control Board until the constitution of the Board was altered during the year to that of a department of Government. The Deputy Director of Agriculture served on a number of *ad hoc* committees during the year and the Senior Agricultural Officer (Headquarters) continued to represent the department on the Tanganyika Industrial Committee.

PUBLICATIONS, 1947

Departmental Pamphlets

45—Thirteenth Annual Report of the Coffee Research and Experimental Station, Lyamungu, Moshi, 1946, by F. R. Sanders.

15—*Kilimo Cha Vitungu Kilimanjaro* by R. J. M. Swynnerton, M.C.

16—*Bohora wa Migomba* by R. J. M. Swynnerton, M.C.

Entomological Circulars

12—List of publications from the Entomological Laboratory, Morogoro, by W. Victor Harris.

13—Locusts by W. Victor Harris.

Articles sent to the editor, East African Agricultural Journal, for publication during the year 1947, were as follows:—

January issue:

"Onion Cultivation on Kilimanjaro" by R. J. M. Swynnerton, M.C.

July issue:

"The Banana Borer" by W. Victor Harris.

"Observations on European Potatoes in Tanganyika" by R. D. Linton.

"Notes on Chickpea and its Cultivation in the Lake Province" by C. G. Glegg.

"Second Supplement to the Revised List of Plant Diseases in Tanganyika Territory" by G. B. Wallace.

October issue:

"Kromnek Disease" by G. B. Wallace.

Finance

The financial provision for the period from 1st January 1947 to 31st December 1947 was £203,050 while actual expenditure was £196,162 details being shown in appendix XIV.

The Empire Cotton Growing Corporation continued to meet the personal emoluments of the three Empire Cotton Growing Corporation Officers posted to this Territory for cotton investigations, and the salary of one Ginnery Inspector amounting to £670 was again provided by the British Cotton Growing Association. The financial assistance afforded by the councils of the above two bodies is again gratefully acknowledged.

The Agricultural Development Fund provided £165,210. The total expenditure incurred in 1947 amounted to £54,475 as it was not possible to begin work on all projects during the period. Details are given in appendix XV.

The following are the estimates of direct revenue secured by the department in 1947, compared with revenue collected during the previous two years:—

	1945	1946	1947
	£	£	£
Bukoba Coffee Grading Fees	2,260	1,208	1,831
Sisal Tax	65,125	22,326	58,234
Coffee Tax	6,822	4,627	6,842
Cotton Tax	4,030	2,222	4,087
Pyrethrum Tax ...	780	749	661
Tea Tax	675	794	685
Total ...	79,692	31,926	72,340

In addition to the provision made under Departmental Head and Agricultural Development Funds, the following provision for services connected with "Agriculture" were made in the Territorial Estimates for 1947:—

Head and Sub-head	Provision from 1/1/47 to 31/12/47	Expenditure from 1/1/47 to 31/12/47
	£	£
Subsidization, Locust Control and Cost of Living Relief:		
Guaranteed Minimum Returns	2,000	1,046
Anti Locust Measures	40,000	5,690
Subventions:		
Imperial Institute of Entomology	500	500
Imperial Mycological Institute	250	250
Imperial Agricultural Bureaux	390	537
Imperial Institute	400	400
Imperial College of Tropical Agriculture, Trinidad	800	800
Coffee Section of the British Empire Producers Organization	155	152
International Locust Control Scheme	2,400	1,728
East African Agricultural Research Institute	4,850	4,727
Grant to Sisal Board	—	49,800
Grant to Coffee Board	5,530	5,069
Grant to Pyrethrum Board	870	653
Grant to Tea Board	710	533
Loans from Territory Funds:		
Agricultural Crop Loans	20,000	14,568
Agricultural Machinery Loans	20,000	20,852
Total ...	98,855	107,305

SECTION III.—LEGISLATIVE CHANGES IN 1947 AFFECTING AGRICULTURAL INDUSTRIES

Coffee.—(i) An Order under the Native Coffee (Control and Marketing) Ordinance, 1937, and cited as the Native Coffee (Compulsory Marketing) Order, 1947, was enacted making it compulsory for producers of native coffee in the Bukoba District to sell their coffee through such agencies as the Bukoba District Native Coffee Board may direct. (Government Notice No. 169 of 1947.)

(ii) Under the authority of the Co-operative Societies Ordinance, 1932 (Ordinance No. 7 of 1932) all producers of non-native mild coffee in the Territory were advised that they are now compelled to sell their coffee to or through the agency of the Tanganyika Coffee Growers' Association. This decision is the outcome of the provision in sub-section (1) of section 36 of the Co-operative Societies Ordinance allowing for the compulsory marketing through an agency registered under the Ordinance which can show that its membership comprises not less than 75 per cent of all producers of the particular commodity handled who in turn produce not less than 75 per cent of the total output of the commodity in the Territory.

Cotton.—(i) An Order under the Cotton Ordinance, 1937 (Ordinance No. 37 of 1937) defining the areas which shall be served by the ginneries in the Lake Province. By this Order a ginnery may only buy seed cotton in the area it is prescribed to serve.

(ii) The Cotton Rules were amended by the Cotton (Amendment) Rules, 1947 (Government Notice No. 154) whereby:—

(a) Transporters of raw cotton or cotton lint using vehicles or water craft other than ships on scheduled railway services are obliged to expose in a conspicuous place on the vehicles or craft a permit issued by the Director of Agriculture authorizing them to carry raw cotton or cotton lint.

(b) Pioneer buying post stores must be built to the specifications set out in the Order.

(c) A buyer is compelled to place his weighing scale with its face towards the seller.

(d) The Schedule III to the principal rules is altered to modify the construction of stores to provide for more efficient rat-proofing.

(iii) An Order enabling the Director of Agriculture to delegate powers to any person under the Defence (Cotton Control: Northern, Southern and Tanga provinces) Regulations, 1944.

Rice.—An Order under the Defence Regulations, 1939, withdrawing the prohibition to sell or be in possession of hand-hulled rices in the following areas: Eastern Province; Dodoma District including the Mpwapwa Division; and "Usangu Markets" in the Mbeya District.

Government Suits.—The Director of Agriculture is given powers to institute suits in respect of loans advanced under the Chattels Transfer Ordinance, 1942 the relevant Order being the Government Suits (Farming Loans) Order, 1947.

Land Bank.—An Ordinance was enacted to provide for the establishment of a Land Bank (Ordinance No. 47).

Control of Weeds.—Authority was given under the Native Authority Ordinance to native authorities in the Lake Province to make Orders for the purpose of preventing and controlling the spread of *Striga hermonthica* and *S. asiatica* (witchweed) and *Vinca Madagascariensis* (periwinkle).

Plant Protection.—An Order was published, The Plant Protection (Importation of Potatoes: Bukoba District) Rules, 1947, which prohibited the importation of potatoes (*Solanum tuberosum*) in the Bukoba District.

Pyrethrum.—(i) The levy imposed on pyrethrum was raised to eleven cents on that grown in the Southern Highlands Province, by the Pyrethrum Industry (Levy) Order, 1947.

(ii) By an amending Ordinance, cited as the Pyrethrum Industry (Amendment) Ordinance, 1947, the Pyrethrum Board was assigned the status of a corporate body, and the periods during which members shall hold office defined.

Export Seeds.—An Ordinance, The Export Seeds Ordinance, 1947, was enacted to provide for the regulation and control of the production and export of seeds, and the formation of a Seeds Board.

Tobacco.—In an amending Ordinance, described as the Non-Native Tobacco Industry (Amendment) Ordinance 1947, provision is made for the Board with the approval of the Governor-in-Council and a resolution of Legislative Council for a direction to be made that all tobacco growers shall sell through an agency to be specified. It is provided that 75 per cent of the growers must agree before such an Order can be made.

CONCLUSION

At the end of 1947 Mr. R. W. R. Miller, C.M.G., relinquished the post of Director of Agriculture to become Member for Agriculture and Natural Resources, an office which co-ordinates and gives direction on policy to those departments of Government dealing with land usage in its widest sense.

R. W. R. Miller became Director of Agriculture, Tanganyika, in 1940 at a critical period in its history, for the needs of a world war rendered increased production of many of the products of the country of first importance. His energy and resource, despite a reduction in technical staff, in organizing increased food production, in stimulating increased pyrethrum growing and in organizing the sisal industry under a unified smooth-working control, were all tributes to his cheerful capacity for co-operation and organization.

It is desired to thank members of the department of all ranks for their continued zeal in the execution of their duties, and to record appreciation of the assistance and collaboration extended by the Provincial Administration.

Numerous boards and committees assist in the work of the department of Agriculture, and thanks are expressed to them and to many departments of Government whose asistance we acknowledge.

A special record of appreciation of the continuous work of production committees is appropriate.

Dar es Salaam,
1st October, 1948

J. C. Muir,
Director of Agriculture

Appendix I

LIST OF EUROPEAN STAFF AS ON THE 31st DECEMBER, 1947

Director : R. W. R. Miller, C.M.G., B.A. (Cantab), Dip. (Agric.) (Cantab), Dar es Salaam

Deputy Director : C. E. J. Biggs, B.Sc. (Lond.), Dip. (Agric.) (Wye), Dar es Salaam

Senior Research Officer: F. R. Sanders, B.A. (Hons) (Cantab), Dip. (Agric.) (Cantab), Lyamungu, Moshi

Entomologists: *F. B. Notley, M.Sc., A.I.C.T.A., Lyamungu, Moshi

*W. F. Jepson, O.B.E., B.Sc. (Lond.), A.R.C.S., Ph.D., Morogoro

Plant Pathologist : G. B. Wallace, B.Sc., Ph.D. (Edin.), Lyamungu, Moshi

Chemist : H. B. Stent, M.Sc. (Tech.) (Vict.), A.I.C., A.I.C.T.A., Nairobi

Botanist : H. Doggett, B.A. (Cantab), A.I.C.T.A., Tanga

Senior Agricultural Officers : D. Sturdy, O.B.E., M.A. (Agric.) (Cantab), seconded to Jamaica
H. P. Smart, B.Sc. (Agric.) (South Africa), A.I.C.T.A., Dar es Salaam
C. J. McGregor, C.D.A., Lushoto
G. W. Lock, O.B.E., N.D.A., N.D.D., Ngomeni, Tanga
J. V. R. Brown, B.Sc. (Agric.), Moshi
*A. H. Savile, C.D.A., A.I.C.T.A., Morogoro
N. V. Rounce, C.D.A., A.I.C.T.A., Mwanza
A. S. Stenhouse, B.Sc., B.Sc. (Agric.) (Aberd.), N.D.A., Lindi
R. D. Linton, B.Sc. (Agric.) (Belfast), A.I.C.T.A., Iringa
*A. Pitcairn, Dip. (Agric.) (Edin.), Tabora
R. B. Allnutt, B.Sc. (Agric.) (Lond.), seconded to Leeward Islands
F. W. Thomas, C.D.A. and C.D.F. (Glas.), Iringa
D. Thornton, B.Sc. (Agric.) (Dunelm), Lyamungu, Moshi

Agricultural Officers : H. Marsland, B.Sc. (Edin.), N.D.A., N.D.D., seconded to Economic Control Board
T. C. Cairns, B.Sc. (Edin.), Arusha
J. K. Robertson, B.Sc. (Agric.) (Aberd.), A.I.C.T.A., Arusha
N. R. Fuggles-Couchman, B.Sc. (Lond.), C.D.A. (Cantab), A.I.C.T.A., seconded to the Managing Agency of the Groundnut Scheme
J. G. M. King, M.B.E., C.D.A. (Wye), A.I.C.T.A., seconded to Cambridge University
J. C. Eyre, B.Sc. (Agric.) (Stell.), D.I.C., seconded to Palestine
H. Gillman, M.Sc., A.I.C.T.A., Dodoma
*T. H. Marshall, Cert. Kew., F.R.H.S., Mbeya
*R. J. M. Swynnerton, M.C., B.A., Dip. (Agric.) (Cantab), A.I.C.T.A., Moshi
*M. Lunan, B.Sc., A.I.C.T.A., Tabora
J. B. Clegg, B.A. (Agric.), Lushoto, Malindi
J. T. Purvis, B.Sc. (Agric.), Shinyanga
T. S. Jervis, Bukoba.
R. W. Collett, on leave
F. E. Luscombe, B.Sc. (Agric.), A.I.C.T.A., on leave
D. H. Drennan, B.Sc. (Agric.), Mwanza
*H. L. Brett, Moshi
E. T. Ward, C.D.A., on leave
*A. H. B. Childs, F.L.A.S., M.R.A.C., Q.A.L.A.S., Iringa
*C. G. Clegg, Dip. Hort. (Wye), Songea
J. D. Hunter-Smith, B.Sc. (Agric.), A.I.C.T.A., Morogoro
D. Morrison, B.Sc. (Agric.), Dip. (Agric.) (Cantab), Masasi
J. S. Gunn, B.Sc. (Agric.), Dip. (Agric.) (Cantab), Mbulu

Tobacco Officer : J. H. McGregor, Biharamulo

Agricultural Officer (Ginnery): R. I. Butler, Mwanza

*Served with the Forces during the war 1939-1945.

Senior Agricultural Assistants : W. C. Clarke, seconded to Montserrat
L. Leslie-Moore, Handeni
W. Sibly-Warne, F.R.H.S., Songea
G. S. Brown, Singida
A. A. E. Weirich, Bagamoyo
R. B. Silcock, Kilosa

Agricultural Assistants : A. Taylor, Kilosa
R. Seager, Kasulu
B. R. D. Eccles, on leave
*E. Pienaar, on leave
A. E. Favell, Bukoba
F. Parke, Ilonga
*T. W. H. Dore, Dodoma
K. B. Louwrens, Iringa
*V. I. Luxemburg, Lyamungu
*G. H. McGavin, Same
T. J. Taverner, Lushoto
V. Allen, Tabora
*J. C. van Schoor, Utete
*D. R. A. Goode, on leave
*K. Johansen, Tabora
J. F. Tregarthen, Ukiriguru
M. L. Reiner, Kondoa-Irangi
*A. M. Pienaar, on leave
*J. I. Thomson, Kilosa
E. Hall, Moshi
*V. C. Allen, Singida
A. S. de Beer, Mbulu

Field Assistant : H. J. P. Nelson, Tabora

Temporary Scientific Assistant : Mrs. M. Wallace, B.Sc. (Lond.), M.Sc. Lyamungu, Moshi

Office Superintendents : *D. F. T. Brown, seconded to Mauritius
*K. C. Pearson, Dar es Salaam

Stenographer : Miss D. E. Lloyd, Dar es Salaam

District Production Committees : Executive Officers: H. A. Wilkin, Arusha

Field Officers : W. S. Isemonger, Dodoma
P. F. Ellis, Sumbawanga

Education Officer : *J. Hebenton, Ukiriguru

*Served with the Forces during the War 1939-1945.

LIST OF PUBLIC GINNERIES LICENSED IN 1947

Province and District	Locality	No. of Gins		Licensees
		Saw	Roller	
Eastern:				
Morogoro	Morogoro ...	—	22	Tanganyika Cotton Co., Ltd.
,, ...	Mikesse ...	—	20	Ladaks, Ltd.
,, ...	Ngerengere ...	—	11	Liverpool Uganda Co., Ltd.
,, ...	Duthumi ...	—	20	Tanganyika Cotton Co., Ltd.
,, ...	Turiani ...	—	16	Tanganyika Cotton Co., Ltd.
Kilosa	Kilosa ...	—	18	Kilosa Ginnery, Ltd.
,, ...	Rudewa ...	—	22	Tanganyika Cotton Co., Ltd.
,, ...	Msowero ...	—	16	Msowero Ginnery, Ltd.
Bagamoyo ...	Mandera ...	—	20	Liverpool Uganda Co., Ltd.
Rufiji	Kilimani ...	—	12	Rufiji Ginneries, Ltd.
,, ...	Msomeni ...	—	15	Rufiji Ginneries, Ltd.
,, ...	Logeloge ...	—	12	Rufiji Ginneries, Ltd.
Ulanga	Kiberege ...	—	16	Devjibhai K. Hindocha.
,, ...	Malinyi ...	—	12	Devjibhai K. Hindocha.
Southern:				
Lindi	Mtua ...	—	14	Kikanda Cotton Trading Co., Ltd.
Tunduru	Tunduru ...	—	14	Kikanda Cotton Trading Co., Ltd.
Mikindani ...	Mikindani ...	—	5	Mikindani Cotton Co., Ltd.
Tanga:				
Korogwe ...	Korogwe ...	—	26	Moshi Trading Co., Ltd.
Handeni	Sindeni ...	—	11	Moshi Trading Co., Ltd.
Northern:				
Moshi	Moshi ...	—	24	Moshi Trading Co., Ltd.
Mbulu	Idulu ...	—	12	Jamal Ramji and Co., Ltd.
Lake:				
Mwanza	Mwanza ...	—	28	Nakasero Commercial Corporation, Ltd.
,, ...	Murutunguru	—	24	Ladha Meghji and Sons, Ltd.
,, ...	Ihale	—	14	Mwanza Cotton Trading Co., Ltd.
,, ...	Bukumbi ...	—	15	Bhagwanji Sunderji and Co., Ltd.
,, ...	Nassa ...	—	20	Sikh Ginners.
,, ...	Buchosa ...	—	14	Buchosa Cotton Co., Ltd.
Kwimba	Pambani ...	—	17	Pambani, Ltd.
,, ...	Nyambiti ...	—	20	Kwimba Ginneries, Ltd.
Musoma	Mugango ...	—	20	Musoma Industries, Ltd.
Maswa	Malampaka ...	—	12	Bhagwanji Sunderji and Co., Ltd.
,, ...	Luguru ...	—	14	Bhagwanji Sunderji and Co., Ltd.
Shinyanga ...	Usogore ...	—	14	Bhagwanji Sunderji and Co., Ltd.

COTTON STATISTICS: SEASON 1947

(By Districts)

Provinces and Districts	No. of Growers (approximate)	Quantity of Seed Distributed	Quantity of Seed-cotton Marketed			Approximate Total Cash Revenue to Natives
			1st Grade	3rd Grade	Total	
		Tons	Tons	Tons	Tons	Shs.
Lake:						
Musoma	10,000	185	2,130·210	352·640	2,482·850	709,880
Mwanza	51,000	1,840	9,402·780	394·210	9,796·990	3,040,428
Kwimba	49,000	700	4,249·160	126·900	4,376·060	1,369,888
Maswa	25,000	915	3,574·230	351·480	3,925·710	1,171,875
Shinyanga	8,000	545	1,099·740	118·810	1,218·550	361,423
Tanga:						
Pare	5,000	35	158·634	19·033	177·667	68,403·21
Korogwe	2,120	21	44·809	8·455	53·264	19,776·87
Handeni	5,710	40	60·872	11·134	72·006	25,684·88
Northern:						
Arusha	200	3	2·300	0·500	2·800	1,035·15
Moshi	2,500	32	152·400	34·300	186·700	67,873·52
Mbulu...	2,000	10	10·200	8·600	18·800	4,953·91
Eastern:						
Kilosa...	5,900	109	599·000	* 314·000	913·000	259,750
Morogoro	7,400	140	550·000	†230·000	780·000	233,479
Ulanga	9,500	120	897·000	144·000	1,041·000	349,528
Bagamoyo	5,000	110	479·000	69·000	548·000	192,873
Uzaramo	800	10	30·000	12·000	42·000	13,677
Rufiji	12,000	150	516·000	86·000	602·000	207,165
Southern:						
Lindi	1,000	7				
Masasi	1,500	12	92·030	6·690	98·720	35,586
Tunduru	5,000	40				
Mikindani	4,000	35				
Total ...	212,630	5,059	24,048·365	2,287·752	26,336·117	8,133,279·54

*Includes 185 tons Planters' Crop Cotton.

†Includes 109 tons Planters' Crop Cotton.

PROVINCIAL ANNUAL REPORTS 1947

Central Province

STAFF

(a). *European.*—At the beginning of the year the province was in the charge of Mr. H. Gillman, Acting Senior Agricultural Officer, who handed over to Mr. R. B. Allnutt, Senior Agricultural Officer, on the 6th March, 1947. With the departure of Mr. Allnutt to take over the post of Director of Agriculture, Leeward Islands, the province was again taken over by Mr. H. Gillman (November 1947). Dodoma District suffered several changes in its staff; Mr. E. Ward, Agricultural Officer, left on the 2nd March, 1947, and was relieved by Mr. L. van Aardt, Agricultural Assistant, who in turn resigned on 1st September, 1947, and was not replaced until 18th October, 1947, when Mr. T. H. W. Dore, Agricultural Assistant, took charge of the Dodoma District. In Singida the Acting Agricultural Officer, Mr. G. S. Brown, was in charge until the 20th June, 1947, when Mr. V. C. Allen, Agricultural Assistant, took over. Kondoa and Manyoni retained the same European staff throughout the year, Mr. M. L. Reiner, Agricultural Assistant, in the former district and Mr. W. S. Isemonger, Field Officer, in the latter.

(b) *Asiatic.*—No Asiatic staff was employed during 1947.

(c) *African.*—The numbers of African staff employed in the various districts under the different categories were as follows:—

	Dodoma	Singida	Kondoa	Manyoni	Mpwapwa	Totals
Grade III L.C.S.						
Clerk	1	—	—	—	—	1
Instructors... ...	2	—	—	—	—	2
Ungraded						
Clerk, L.C.S. ...	1	—	—	—	—	1
Instructors, L.C.S.	5	6	5	4	1	21
Recorders, L.C.S. ...	2	—	1	—	—	3
Food Production						
Staff	18	23	16	5	4	66
N.A. Instructors ...	19	26	16	5	8	74
Messengers... ...	1	—	—	—	—	1
	—	—	—	—	—	—
Total No. of						
Instructors ...	44	55	37	14	13	163
Total No. of						
other Staff	5	—	1	—	—	6

In addition to the above Instructors, five student Instructors returned from Ukiriguru in December and proceeded on a month's leave before taking up work in the districts. The 1947 batch of Ukiriguru students totalled five, of which two came from Singida, two from Kondoa and one from the Dodoma District.

WEATHER

There was a very welcome relief from the normal Central Province semi-arid rainfall regime during the 1946-47 season, with totals at various stations ranging between 36 to just under 40 inches (November to June) instead of the average of 20 to 27 inches for the same period. The season started well throughout most of the province although in the latter half of December 1946 there were areas in the Dodoma and Kondoa districts which suffered prolonged dry weather. After that followed an almost ideal season, with Dodoma achieving the distinction in January of being the wettest station in the Territory, having recorded a total of 16·42 inches during that month. Singida and Manyoni also had very heavy rains during January, with 11·77 inches at the former station and 10·91 at the latter. The dry spell usually experienced in January-February did not materialize and the three months February, March and April enjoyed very well-distributed rain with a minimum total of just under five inches per month. The monthly rainfall for some of the more important stations, both on a seasonal and on an annual basis is shown in annexure No. 1 to this report.

FOOD POSITION

At the beginning of 1947 famine and the great deal of work entailed in the distribution of famine relief was a major consideration in several districts of the Central Province.

The famine was at its peak in the months of January and February in the Kinyambwa, Bahi and Unyangwira chiefdoms (Dodoma and Manyoni districts); in the Usandawe chiefdom (Kondoa District); and to a smaller and more localized extent in the Wilwama chiefdom (Singida District). Food shortages were also very evident in many other localities, but these did not receive organized famine relief beyond arranging for the despatch of food to the nearest trading settlements where those in need of food could purchase their requirements.

The excellent and continuous rains experienced in January and February hastened the ripening of green maize, pulses, vegetables and, by providing lush grazing, also rapidly improved the milk supplies. The famine areas thus began to be self supporting by the end of February and it was possible to discontinue or reduce famine relief in the month of March. There followed a general improvement in the food position and by the end of the grain harvests the province found itself with an abundance which it had not known for many years.

This abundant harvest was a gratifying change from the anxieties of the previous five years and enabled the districts to make full use of the recently built grain silos by setting aside a valuable reserve towards meeting the requirements of the next inevitable poor season. By the end of the year the province possessed 104 burnt brick grain silos which held the following amounts of grain as at 31st December 1947:

District	No. of Silos	Tonnage of grain stored
Dodoma	25 ...	* 1,800
Manyoni	7 ...	*582
Mpwapwa	10 ...	*919
Singida	42 ...	1,605
Kondoa	20 ...	1,093
Total ...	104 ...	5,999

*Includes tonnage stored in native wicker-work type of storage bins.

An unfortunate, but perhaps not unexpected result of the 1947 abundance was the general relapse to a carefree improvidence. No doubt celebrations were justifiable in the weeks just following the harvest, particularly as there had been a backlog of tribal ceremonies such as circumcision ceremonies to be worked off, ceremonies which had had to be postponed during the famine years. But when these celebrations began to interfere with the seasonal activities of preparing the land, manuring, soil conservation work and dry planting, the position became serious, and in fact by the time the rains broke the agricultural preparations for the coming season were considerably behind. The effect of this has been a reduced acreage of early planted grain crops, which will reflect on the 1948 harvest if the January and Fel ruary rains are insufficient for planting additional land to these crops.

FOOD CROPS

Grain Crops.—The heavy rains and the very favourable distribution of these rains ensured that good yields were reaped off most sorghum, millet and maize plantings. The variability in stand of grain crops typical of the Central Province was still evident, but whereas in a poor year the efforts at supplying bare patches by transplanting thinnings were often unsuccessful because of the January and February dry spells, during the 1946-1947 season the almost continuous rainy weather resulted in a high percentage of successful transplantings, giving a much better stand and

more thorough use of the land. Another factor which contributied to a bumper grain crop was the greater acreage which had been planted, a measure carried out partly in response to exhortations, but largely because the lesson of the previous disastrous season demanded the planting of the maximum acreage possible. This did not apply, however, to the actual famine areas, since the depleted strength of those dependent on famine rations limited the amount of work they could do each day on the land. Also many of the men folk moved to more favourable areas, as far afield as Arusha, and thus reduced the manpower available for cultivation.

ROOT CROPS

At the beginning of 1947 the supply of sweet potato planting material was at a very low level except in the Singida District, mainly the result of the previous very dry season, but also due to a general disregard to protect and maintain the three ridges of sweet potato required by Native Authority orders. To ensure future supplies many communal sweet potato plots were planted, and at the same time a drive to obtain as many individual plots as possible was also instituted, the best results being obtained in the Singida District.

Cassava is grown to a certain extent in Manyoni, Singida and Kondoa, but it has never been looked upon with favour by the Wagogo. Its value in providing a long term famine reserve indicated that another attempt should be made to persuade the Wagogo to grow it, at the same time encouraging the other tribes to extend the present acreage under cassava. A sum of £700 was asked for and provided by Government for the purchase of cassava planting material, since the supply of this was inadequate both in the Dodoma and Manyoni division. It was planned to build up supplies of planting material by importing cuttings from Bagamoyo and Tabora districts and planting these at selected localities. The first consignment of cuttings arrived at the beginning of the dry season, but it was hoped that the fringes of a swamp near Dodoma would provide sufficient moisture to establish these cuttings. The soil however was too heavy and the constant depredations of game resulted in only a very few plants surviving. In Manyoni the importations of cuttings from the Tabora District was not attempted until the end of the year, when a consignment of five wagon loads was ordered from Igalula. In addition, cuttings were also obtained from the south-west of the Manyoni District. These cuttings were to be distributed to all the villages situated on top of the Rift Wall, each village to grow the cuttings on a communal basis. These communal plots should then provide sufficient planting material for each member of the village to grow his own individual plot in 1949.

CASH CROPS

(a) *Grains.*—Grain crops constitute quite an important cash crop in years of good harvest, as, for example, in 1940 and 1941 when the amounts sold totalled 3,400 and 3,377 tons respectively. During recent famine years, however, the sale of grain crops has declined considerably as is shown in the table below, while in 1946 the sale of grain except through the Native Authority famine organization was prohibited. The sale of millets and sorghums was again prohibited in 1947 in order that the reserves of the province, both communal and individual could be replenished. This restriction, however, did not apply to the sale of maize, and in Singida was relaxed at the end of the year with regard to the sale of millets. An indication of the excellent grain harvest garnered in 1947 is the 5,999 tons of mixed millet which it was possible to store in the grain silos referred to above and the 1,237 tons of maize together with the 99 tons of millet sold through the Native Authority markets. The following table gives a comparison of the deposits and sales made over the past eight years:—

Grain Production in Tons

(Sorghum, Millet and Maize)

Year	Dodoma	Singida	Kondoa	Central Province Total Tons
1940	1,959	442	999	3,400
1941	1,708	976	693	3,377
1942	11	95	479	585
1943	—	206	—	206
1944	525	232	29	786
1945	471	296	92	859
1946	* 1,465	2,250	590	4,305
1947	* 3,301	1,605	1,093	5,999
	† 449	787	—	1,236
			Total 1947	7,235

NOTE.—Dodoma in these tables includes Manyoni and Mpwapwa.
*Tonnage of grain deposited in grain silos.
†Tonnage of grain sold through Native Authority markets.

(b) *Rice.*—A year of ample rainfall such as was experienced in 1947 favoured the production of rice. Though the amount actually marketed only totalled 69 tons, it is known that a considerable quantity never passed through the normal channels and it would be safe to estimate that production was in the neighbourhood of 200 to 300 tons. This was more in keeping with the production records during the early 'forties when the output ranged between 346, 210 and 531 tons as shown below:—

Rice Production in Tons

Year	Dodoma	Singida	Kondoa	Central Province Tons
1940	337	7	2	346
1941	198	9	3	210
1942	496	12	23	531
1943	9	9	—	18
1944	140	1	—	141
1945	27	2	—	29
1946	½	—	—	½
1947	69	—	—	69

(c) *Groundnuts.*—1947 was a reasonably good groundnut year in that production was better than in the previous five years, but still not up to the 2,000 ton or more standard which prevailed before 1943. The total marketed in 1947 was 1,677 tons (including 50 tons unshelled groundnuts required by the United Africa Co. (M.A.) for seed) compared with 721 tons in 1946 and 1,260 tons in 1945. Singida particularly showed a striking recovery with its 1,214 tons. Full comparative figures were as follows:—

Groundnuts Production in Tons

Year	Dodoma	Singida	Kondoa	Central Province Tons
1940	1,185	927	152	2,264
1941	785	1,200	118	2,103
1942	1,360	1,966	185	3,511
1943	48	821	2	871
1944	887	256	18	1,161
1945	905	353	2	1,260
1946	614	107	—	721
1947	443	1,214	20	1,677

(d) *Onions.*—Singida has steadily been increasing its output of onions and in 1947 produced a record total of 342 tons, which is a marked improvement on the 99 and 122 tons obtained over the previous two years The other districts maintained their average production and the province yielded a total of 415 tons compared with 174 tons in 1946 and 256 tons in 1945 The demand for seed continues and the supply available for the 1947-48 crop was quite inadequate to meet the increasing use being made of onions as a cash crop.

(e) *Potatoes.*—The small output of potatoes in the higher areas of Kondoa, Mpwapwa and Singida improved slightly, and 61 tons were marketed as against 56 tons in 1946 and 40 tons in 1945. The Wota Plateau and the Buga area in the Mpwapwa District would be suitable for increasing the production of potatoes and arrangements were made to distribute more seed in these two localities.

(f) *Castor Seed.*—The price of 35 cents per kilo for this commodity has greatly stimulated interest in castor seed and more plantings are being made each season. During 1947 the increased crop collected from these extended plantings reached the record total of 306 tons (comparable figures for 1946 and 1945 were 94 and 160 tons respectively), the greater portion of which came from the Mpwapwa District. Kondoa has also appreciated the profits to be made from this easy-to-grow crop, and production in that district rose from 15 tons in 1946 to 39 tons in 1947.

(g) *Gum.*—The amount of gum collected is usually inversely related to the condition of the grain harvests. If the season is a favourable one and the prospects are good for bumper food crops the efforts expended on gum collection are accordingly reduced, and only what might be termed the professional collectors move out into the gum areas. Such conditions prevailed in 1947, and the anticipated reduction in output was reflected in the market returns, which showed a total of only 106 tons of gum. Details of this and previous years' production were as follows:—

Gum Production in Tons

Year	Dodoma	Singida	Kondoa	Central Province
				Tons
1940	35	165	—	200
1941	34	152	—	186
1942	36	218	—	254
1943	27	138	—	165
1944	80	281	—	361
1945	20	150	1	171
1946	43	139	1	183
1947	48	58	—	106

(h) *Beeswax and Honey.*—A similar correlation with the size of the grain harvest should prevail in the case of beeswax; but despite the excellent harvests, there was a slight improvement in the amount of beeswax collected, 40 tons as compared with 30, 34 and 31 tons over the preceding three years. There was also a marked increase in honey collection, totalling 185 tons. The production over the past eight years was as follows:—

Beeswax and Honey Production in Tons

Year	Dodoma		Singida		Kondoa		Central Province	
	Wax	Honey	Wax	Honey	Wax	Honey	Wax	Honey
1940	16	—	8	—	14	—	38	—
1941	31	—	7	—	19	—	59	—
1942	21	—	9	—	18	—	48	—
1943	88	—	36	—	26	—	150	—
1944	15	—	8	—	8	—	31	—
1945	15	28	5	—	14	63	34	91
1946	18	17	3	—	9	40	30	57
1947	17	89	9	—	14	96	40	185

(i) *Pulses.*—Pulses do not often figure as an important cash crop in the economy of the Central Province, but in 1947 the record total of 551 tons of mixed pulses was marketed. Of this total 311 tons represented cowpeas 115 tons Bonavist bean (Fiwi) and 69 tons pigeon pea. Aside from the excellent season experienced another factor which brought about this marked increase in the production of pulses was that in Kondoa (which contributed 305 tons out of the provincial total of 551 tons) the issue of various legumes as famine relief provided the people of Usandawe and Burungi with the necessary seed to carry out extensive plantings of pulse crops.

(j) *Brown Sugar.*—This is a minor industry run by a few enterprising Africans. Production during 1947 totalled 111 tons as compared with 80 tons in the previous year. It is considered however, that a considerable amount of jagree which was actually produced disappeared into the black market.

(k) *Sesame.*—A small amount of sesame is produced in the Mpwapwa District and this season totalled 9 tons (6 tons in 1946).

(l) *Rubber.*—There are two small rubber estates near Saranda (Manyoni) but production has ceased since about the middle of the year, the price of rubber having fallen to an uneconomic level. Production figures show that three-quarters of a ton was produced in 1947, 7 tons in 1946 and 21 tons in 1945.

PESTS AND DISEASES

(a) *Locusts.*—There was no locust activity within the province during 1947.

(b) *Army Worm.*—Sporadic outbreaks of army worm were reported from most districts in December 1946 and in January 1947 but these outbreaks caused no serious damage and soon succumbed to the heavy rains. At the end of 1947 outbreaks again occurred in all districts and, with the advent of a long dry spell throughout most of December, the damage to young grain crops in several areas was considerable.

(c) *Stalk Borer.*—Singida reported heavy infestation of stalk borer, while Kondoa was considered to have been remarkably free of this pest.

(d) *Rats and Field Mice.*—1947 has been remarkable for the phenomenal increase in the field mouse and rat population. Fortunately the amount of damage caused to the 1947 harvest was not serious, but there has been considerable damage to the plantings of the 1948 grain and sunflower crops.

(e) *Birds.*—These are a recurrent pest to the grain crops particularly of the Singida District. The usual preventive methods were taken, bird scaring at the time the grain is ripening and nest destruction during the breeding season.

(f) *Vermin.*—Depredations by pig, baboon, elephant and various types of buck were reported, with particular damage to the root crops. Organized hunts against pig and baboon are not a common feature amongst the local tribes, but two such hunts against baboon were arranged by the Field Officer in Manyoni and achieved excellent results. A general shortage of ammunition, however, makes it difficult to carry out any consistent vermin destruction policy.

(g) *Diseases.*—The incidence of rosette in groundnuts appears to have been light during this season of abundant rain. Grain smut was observed in most of the Dobbs sorghum plantings, but otherwise no reports were received of serious damage due to any of the smuts.

SOIL CONSERVATION

Dodoma.—In consultation with the District Commissioner and the chiefs it was decided not to demarcate contour banks, as the very heavy rains had caused a fair amount of breaching of the large number of banks constructed in 1946 and it was considered advisable to repair these before proceeding with any new areas. Unfortunately, changes in staff during the main soil conservation season meant that insufficient supervision could be given to the enforcement of such repair work and progress has as a result been poor.

The all too common practice of planting crops on these contour banks and of planting in or along the sides of gullies was made the subject of special propaganda, and orders prohibiting such plantings were issued.

The work on rehabilitating the badly eroded and overgrazed land in the Dodoma Township was carried a stage farther by dealing with an area of approximately 300 acres adjacent to the mental hospital. Funds were again provided by the Provincial Administration who also made available a supervisor for the labour and handled the paying of the labour, while the Agricultural Department with the assistance of the Veterinary Department provided the technical supervision and carried out the demarcation of the contour lines. Whereas in 1946 the rehabilitation treatment included bush clearing followed by the construction of a series of contour banks and a storm drain, in 1947 the treatment was varied, with a part of the area merely cleared and the brushwood laid in contour lines at thirty-yard intervals, and the other arable part protected with the routine contour banks and a storm drain.

Singida.—Contour banking still remains the major soil conservation measure and four teams of instructors with their striding levels moved from area to area pegging lines. The work in 1947 was concentrated in the Turu country and a total of over 9,000 plots were demarcated in the Mungaa, Wilwana, Ikungi and Ihanja chiefdoms. The actual length of banking constructed was estimated to have totalled 370,000 (210 miles). In addition to these individually constructed contour banks there were also three communal contour banking schemes, one in co-operation with the Veterinary Department on their grazing reserve at Kititimo; another in co-operation with the Public Works Department above the Singida-Itigi road near Puma and a third scheme near the Singida aerodrome.

The use of tie-ridging is being advocated and demonstrated and several small plots have been tie-ridged in various chiefdoms to serve as object lessons for future more wide-spread propaganda on the value and necessity of this measure.

Kondoa.—Very satisfactory progress in the extension of contour banking was made in the Kondoa District with the praiseworthy total of 514 running miles of banking constructed during 1947. More than half of this work was carried out in the Chungai-Filimo Resettlement Area in pursuance of one of the original tenets of this resettlement scheme that the surplus population moved from the seriously eroded Irangi Plateau should not repeat the mistakes of the past but should start their occupation of the new area by taking adequate steps against soil erosion. Two soil conservation teams were posted to the Chungai area and they pegged out contour lines on 322 plots in Kandaga and 295 plots in Masanga, representing a total of 247 miles of banking.

Other soil conservation teams worked in Usandawe and in Bereko resulting in the construction of 212 miles of banking in the former area and 55 in the latter.

The above achievements were not obtained without a large number of court cases totalling 431 convictions and entailing a good deal of additional work in the native courts. But strong measures in the early stages are essential, for if consistently carried out they soon result in a more wide-spread adoption of the orders being enforced.

Manyoni.—Contour banking is making steady progress and on the plateau, where ridge cultivation is a common practice, a start has been made in realigning the ridges along the contour and encouraging cultivators to introduce ties. The greatest success in introducing tie-ridgings has been achieved in the Makwesi area.

Steep slopes on the scarp edge at Nkunzi, Chibwe and Itetema areas are being withdrawn from cultivation and the inhabitants persuaded to move farther in on the plateau or down on to the fan slopes.

Mpwapwa.—The soil conservation teams moved south during 1947 and carried out their work of demarcating contour lines in Berege, Kibakwe and Mlunduzi areas. Tie-ridging was encouraged in the Mpwapwa chiefdom where groundnuts are cultivated on the ridge; but this measure is not very favourably looked upon in the Kongwa-Bwaga-Mali chiefdoms, where most of the plantings are still on the flat.

WATER SUPPLIES

Singida.—A large dam was completed at Kidaru and others started at Mgori and Mtepe under the advice of the Water Development Department, which also assisted in the construction of two smaller dams making use of the old railway embankment as a dam wall and half building up a large culvert to serve as the spillway.

Dodoma.—One large dam holding 3,000,000 gallons was constructed at Makutupora using cattle tax money and funds from the Water Development Department to pay for part of the cost, with a great deal of the labour being employed on a communal turnout basis.

Kondoa.—A dam estimated to hold more than seven million gallons was constructed in the Goima area, with the labour being on a tribal turnout basis and half as paid labour. Another large dam (approximately 5,000,000 gallons) was constructed at Mkekene under the supervision of the Provincial Tsetse Assistant. In the Chungai Filimo area two dams were constructed under the supervision of the Water Development Department, but another year went by without the installation of the five to six mile pipe line from Kandaga. A dam for the joint use of trade stock and residents was also built at Murijo under the supervision of the Veterinary Department.

Manyoni.—Three dams were started under the advice of the Water Development Department, one at Itigi, one at Makasuku and one at Sasajila, each to hold approximately one to two million gallons.

Mpwapwa.—Improvements to water supplies included relaying and extending the pipe line at Mima, improving the pipe line at Sagara, and fitting pumps and building troughs for the boreholes at Kongwa and the well at Gulwe.

REHABILITATION AND RECLAMATION

Kondoa.—The advent of sleeping sickness in Irangi with a total of 196 cases (resulting in 13 known deaths) made necessary sudden changes in the clearing programme. A three-quarters of a mile to one and a half mile wide skyline defence was at once started along the Bubu River which gave a clearing totalling 28 square miles.

In the north-east and east of Irangi some 21 square miles were cleared as part of a territorial measure to protect the Great North Road, the clearings being along the Kikori-Kisese-Itororo Road, and in the valleys reaching up to the top of the plateau from the Kikori area.

Other clearings were undertaken at Chambalo designed to cut off the advance of fly into the Burungi country and to defend another section of the Great North Road; at Banguma for the reception of people from the sleeping sickness areas of Usandawe (Songa and Simbo); and at Farkwa, completing the clearing started in 1946.

The total amount of labour employed on these Usandawe Irangi and Burungi clearings was more than 451,000 man days, of which about 142,000 man days represented tribal turnout the remainder coming under the category of paid labour under territorial schemes.

Singida.—The work of enlarging the perimeter defences around the central fly free block of the Singida-Mkalama District continues with a vast drain on the manpower resources of the Turu and Iramba people. Over 400,000 man days were

expended in 1947 on new clearings and reslashings at Ikungi, Ihanja, Msughaa, Mgori, Munyu, Sepuka, Ushoro, and Kidaru. The problem of bush regeneration, however, grows with the ever larger area of barrier clearings achieved, and the intention that these clearings should be settled is far from being fully realized.

Manyoni.—A serious threat that the Bahi Depression will be invaded by tsetse-fly in the immediate future, with all the implications of such an invasion on the large track of fly-free cattle country to the east, made the establishment of a new defence line a matter of vital importance. It was decided to clear a line along the base of the Rift Wall running from Kilimatinde to beyond Makasuku, a line sixteen miles in length and two miles wide. Another shorter line was also required at a point south of Mgunduko joining the open Surungai plain and the Rift Wall. Of these lines thirteen square miles were cleared during 1947 and, in addition, four square miles of bush was cleared as extensions of the Manyoni and Itetema clearings.

RESETTLEMENT

Kondoa.—The policy of reducing the overcrowded Irangi Plateau by moving the surplus population down to the eastern fan slopes in the recently cleared Chungai-Filimo area was again hampered by the non-appearance of the five miles of piping which is to bring water to the resettlement blocks situated farther out in the plains. Notwithstanding this setback, 180 families were moved into the better-watered blocks near the plateau, bringing the total in the Chungai scheme to 804 families. These movements are largely compulsory and at the end of 1947 there was trouble in one area (Haubi) when 160 people refused the injunction to move down into the plains. The ringleader of this group was tried and convicted, but an appeal has been lodged.

Other compulsory resettlement schemes were in connection with sleeping sickness areas, representing 250 families successfully moved from Mangaloma and Kumite into the Bubu River clearings and eighty families moved from the Simbo and Songa areas of Usandawe. It is interesting to record that when these eighty families were moved it was found that each family possessed on an average thirty hundredweight of grain four or five months after the harvest.

Voluntary resettlement from the Irangi Plateau is steadily taking place in the direction of Busi, Pahi and Chemchem.

Singida.—A very well organized resettlement scheme was arranged for the movement of the scattered population in the south-east of the Singida District to the Ikungi 1946 and 1947 clearings. The reception area was made attractive by the provision of new houses, water supplies, storage for grain, and lorry transport was available for those needing it. One hundred families were moved with the assistance of this lorry transport and, in addition, a further sixty families moved without such assistance, bringing the total number of people resettled under this scheme to 536.

Manyoni.—No further resettlement occurred, but the people brought into Muhalala, Itetema and Zuboro in 1946 are establishing themselves though at the beginning of 1947 many of them had to continue receiving famine relief until their crops had matured.

NATIVE AUTHORITY SEED FARMS

Dodoma.—The Tribal Seed Farm carried 54 acres of various grain crops for seed multiplication (Dobbs and Bukura Mahemba Sorghum, Nyasaland and Awned Bulrush Millet, Katumbili and Yellow Maize). These plantings yielded a total of 27 tons of seed, the bulk of which has been distributed throughout the Dodoma and Manyoni chiefdoms. Dobbs gave the best average yield, with 1,758 lb. per acre (manured at 3 tons per acre) and Bukura Mahemba with 1,382 lb. per acre (also manured at 3 tons per acre). The Katumbili maize, unmanured, only gave 4½ bags to the acre.

Various trials were conducted and have been reported upon separately. On the whole, these trials did not give very satisfactory results owing to the great soil heterogeneity found on the farm. The variety trial showed that in this year of abundant rainfall the local sorghum variety, Lugugu Red, significantly out-yielded Dobbs, mainly because the Dobbs sorghum was adversely affected by the common grain smut, which did not appear to be serious on the Lugugu.

A large number of sweet potato varieties were collected from the various districts and established on observation plots. A small cassava plot was also maintained, and considerably extended at the end of the year.

Singida.—The Tribal Seed Farm at Iguguno is divided into 68 plots each of just over 4,000 square yards. Besides producing seed of improved varieties of various grain and pulse crops, it also provides a demonstration of manuring, tie-ridging and alternate husbandry, with a portion of the 68 plots regularly withdrawn from cultivation and left to go down to grass for a period of three years.

Yields during 1947 were good, especially in the case of maize, which yielded at the rate of 7½ bags to 11 bags per acre on the different plots cultivated. Dobbs sorghum gave a yield averaging 1,564 lb. per acre and groundnuts (Kingo, a local Kingo, a local selection) a yield, unshelled, of 600 lb. per acre. Kidney beans, tepary beans and soya beans yielded at the rate of 165, 213 and 79 lb. per acre. Two acres of sunflower were also grown but were planted late in the season (at the end of March) and thus gave only 59 lb. per acre of seed.

The total amount of seed produced on the farm for distribution in the district was 12 tons of grain, 1½ tons of groundnuts and 1 ton of pulses.

Kondoa.—The small seed farm again did not prove very successful, and it has been decided to abandon the site and transfer activities to a new farm to be laid out in 1948 in the Chungai resettlement area

ACKNOWLEDGMENTS

The assistance and co-operation of the Administration and of the Veterinary, Tsetse and Water Development departments is gratefully acknowledged.

H. Gillman,
Acting Senior Agricultural Officer,
Central Province

SUMMARIZED RAINFALL STATISTICS FOR CERTAIN STATIONS IN THE CENTRAL PROVINCE

The Year 1947 (in inches)

	Dodoma		Mpwapwa		Kondoa		Singida	
	1947	Average	1947	Average	1947	Average	1947	Average
January ...	16·42	6·06	7·22	6·01	8·29	5·25	11·77	5·41
February	4·95	4·27	4·92	5·38	5·25	4·53	11·86	4·34
March ...	4·82	5·65	5·65	6·08	5·33	5·74	4·08	5·17
April ...	7·09	1·71	5·34	2·74	8·08	3·60	3·03	2·55
May ...	0·38	0·24	2·27	1·12	2·94	1·43	1·37	0·45
June ...	0·85	0·01	0·24	0·13	1·84	0·06	0·64	0·07
July ...	—	—	—	0·02	—	0·01	—	0·03
August ...	0·02	—	—	0·03	—	0·01	—	0·02
September	—	0·09	—	0·14	—	0·06	—	0·07
October ...	—	0·17	—	0·20	—	0·20	—	0·12
November	0·50	1·17	0·22	0·03	1·74	1·43	—	1·62
December	7·60	3·77	4·84	4·31	3·25	3·80	4·74	5·33
Total	42·63	23·14	30·70	27·40	36·72	26·12	37·49	25·18

The Season 1946-1947 (in inches)

	Dodoma		Mpwapwa		Kondoa		Singida	
	1946-47	Average	1946-47	Average	1946-47	Average	1946-47	Average
November	0·75	1·17	2·21	0·03	1·10	1·43	1·95	1·62
December	1·46	3·77	2·92	4·31	4·41	3·80	5·18	5·33
January ...	16·42	6·06	7·22	6·01	8·29	5·25	11·77	5·41
February	4·95	4·27	4·92	5·38	5·25	4·53	11·86	4·34
March ...	4·82	5·65	5·65	6·08	5·33	5·74	4·08	5·17
April ...	7·09	1·71	5·34	2·74	8·08	3·60	3·60	2·55
May ...	0·38	0·24	2·27	1·12	2·94	1·43	1·37	0·45
June ...	0·85	0·01	0·24	0·13	1·84	0·06	0·64	0·07
Total	36·72	22·88	30·77	25·80	37·24	25·84	40·48	26·94

PROVINCIAL ANNUAL REPORTS 1947—(*contd.*)

Eastern Province

STAFF

(a) *European.*—(i) Mr. A. H. Savile, Senior Agricultural Officer, was in charge of the agricultural work of the province throughout the period under review.

(ii) *Morogoro District.*—Mr. J. D. Hunter-Smith remained in charge of the district and, from the 22nd June when Mr. A. Taylor, Agricultural Assistant, proceeded on leave, he was without the services of an assistant in the field. However, the problem was solved by the part-time employment of Miss A. J. Prytz on secretarial work connected with the Production Committee and by the ability displayed by Mr. R. V. Joshi, Asian Clerk, in dealing with the despatch of planting material and sale of produce from the farm. With the commencement of the agricultural survey of the Uluguru mountains the Agricultural Officer, Morogoro, will, however, require the assistance of another officer to supervise district activities.

(iii) *Kilosa District.*—Mr. R. B. Silcock returned from leave and resumed charge of all district work as well as the secretarial duties of the District Production Committee on 26th February.

(iv) *Mahenge District.*—Mr. G. N. B. Pletts, Field Officer, was transferred to Lyamungu during March. Thereafter the district's agricultural activities were supervised very effectively by the District Commissioner, Mr. J. T. R. C. Rodger, assisted by Captain R. G. Fairweather, Temporary Crop Supervisor. Mr. Rodger's energy and unfailing interest in agricultural matters have been of very great assistance to this department throughout the year and it is to be regretted that the staff position has not allowed the posting of an experienced officer to Mahenge to assist in the development of this productive district.

(v) *Uzaramo District.*—Mr. J. M. van Dyk, Agricultural Assistant, was in charge of all district work until 26th June when he proceeded on leave pending resignation owing to ill-health.

(vi) *Bagamoyo District.*—Mr. A. E. Weirich, Senior Agricultural Assistant, was in charge of the district work throughout the year and, in addition, took charge of the work in Uzaramo District when Mr. van Dyk proceeded on leave. Mr. L. H. Rustean, Temporary Crop Supervisor, arrived on first appointment on 24th May and was employed in connection with crop production in the inland areas of the district.

(vii) *Rufiji District.*—Agricultural work was under the charge of Mr. J. C. van Schoor, Agricultural Assistant. During the latter four months of the year he was assisted by Mr. D. Desaubin, Temporary Crop Supervisor, who was employed on coconut sanitation work.

(viii) *Mafia Island* remained without any representative of the agricultural department.

(ix) *Ilonga Experimental Station, Kilosa*, continued under the charge of Mr. A. G. Bebbington, Senior Scientific Officer, (E.C.G.C.), who was assisted by Mr. J. I. Thomson, Agricultural Assistant.

(b) *African.*—(i) The departmental staff of Instructors (Local Civil Service) numbered 74 of which three were Graded and 71 were Ungraded. One instructor died of tuberculosis, three resigned owing to ill-health, and three were dismissed for incompetency. Replacements were recruited from the Temporary Instructors (Food Production Staff). The Temporary Instructors varied from 80 to 90 according to the season. Seven Copra Instructors (Local Civil Service) were employed on copra grading and field sanitation.

(ii) A few instructors are employed by the Native Authorities in Morogoro, Kilosa and Ulanga, more especially in connection with soil conservation work. In Ulanga there is a team of 10 Native Authority soil conservation instructors who underwent a month's intensive training under Grade III Instructor Thomas Kayombo.

(iii) The instructor staff worked well and though the average educational standard is low their work has in the majority of cases been very satisfactory, especially when one remembers the type of native amongst whom they have to work.

CLIMATIC CONDITIONS

Briefly it may be said that the short rains at the end of 1946 petered out unexpectedly which resulted in a rather prolonged gap between the short and the long rains. This afforded growers an excellent opportunity of preparing their fields for long rains plantings. The long rains were very well distributed throughout March, April and May and continued in the form of light showers throughout June. Growing conditions for maize, sorghums, cotton and paddy were ideal and bumper crops were harvested where weeds and pests did not intervene. Even the Rufiji floods did less damage than might have been expected, owing to the fact that the river level receded again before too much of the paddy crop had been drowned.

AGRICULTURAL INSTRUCTION AND EDUCATION

With a few notable exceptions the Native Authorities appear incapable of supporting the work of the agricultural instructors unless given a direct order by the District Commissioner. They are far too prone to offer the time-honoured excuse "we are awaiting the orders of the District Commissioner"—the implication being that the District Commissioner has to issue a special order even for all annual routine measures.

As mentioned above, ten Native Authority Soil Conservation Instructors were selected by the District Commissioner, Mahenge, and given an intensive short course in soil erosion and soil conservation methods. Each was provided with an "A" pattern striding level and sent out to work in various strategic areas. It is too early to state if any permanent progress has been achieved; but around Mahenge there is a very noticeable advance in contour banking on many native fields.

Grade III Instructor Thomas Kayombo was transferred from Mahenge, in November, for attachment to the Bigwa Teachers' Training Centre, near Morogoro, where he is to teach the elements of botany, agriculture and soil conservation to the senior classes. Thus from the end of 1948 onwards all teachers leaving Bigwa Training Centre will have a good grounding in agriculture and soil conservation. This is the first step towards the teaching of agriculture in all schools, without which the Territory cannot hope to achieve the progress in agriculture that is vital to the well-being of the great majority of the native population.

If conservation farming is to replace the existing soil mining before it is too late then it is absolutely essential that the rising generation of school children of both sexes should be taught the basic principles of good husbandry and soil conservation. The first step is to include agriculture in the curriculum at all Teachers' Training Centres and finally in all village schools. This has been arranged at Bigwa without detriment to the general teaching curriculum, and it is considered that a similar move should be made at all Teachers' Training Centres in the Territory.

NATIVE WELFARE

Kidai Irrigation Scheme.—The Senior Agricultural Assistant, Kilosa, continued the work begun in 1946 and the furrow continued to prove of great benefit to the natives in that area.

SEED DISTRIBUTION

Large quantities of onion and vegetable seeds are distributed annually to natives through the agricultural instructors and at the agricultural offices at Morogoro and Kilosa. The onion seed is obtained by the department from India and is known as "Bombay Red". Vegetable seeds are purchased, through an advance account with the Native Treasury, from J. W. Newton of Turbo Valley, Kenya. Without doubt this function of the department is becoming increasingly popular with native growers and is of material assistance in maintaining the production of vegetables for both Dar es Salaam and Kongwa.

PIECEGOODS DISTRIBUTION IN BAGAMOYO

At first sight this might appear to be outside the scope of the Agricultural Department. The action of the Senior Agricultural Assistant in obtaining and personally supervising the distribution of fifteen bales of piecegoods to needy persons in the areas of agricultural production (as opposed to townships) has done much to satisfy the needs of natives who have hitherto received less than their fair share of the wherewithal to clothe themselves. Each village received a quota in proportion to the produce it had marketed during 1947, which should serve as a stimulus to the unproductive areas during the coming season.

SLEEPING SICKNESS SETTLEMENTS

The nine settlements in Ulanga continued to prove their value as a foundation for the future well-being of the native population. The improved medical facilities, the greatly improved health of the people and the density and extent of cultivation are indicative of a thriving population. The expanding population has necessitated extensions to some of the settlements which were too small in the first instance. These have been carried out under the direction of the Settlement Officer. One additional settlement is being undertaken in 1948.

It is considered that concentration of the population on similar lines should be undertaken in the Rufiji District in order to bring about a similar improvement in the natives' health and welfare.

FOOD SUPPLIES

Food supplies were abundant throughout the province except in Dar es Salaam township. In addition to requiring large-scale imports of foodstuffs from elsewhere in the Territory, it annually consumes enormous quantities of native produce which is carried direct on lorries and by head-loads into the township. This is inevitable but it will be appreciated that it also results in the diversion of produce from district markets which lie within easy distance of Dar es Salaam. Thus, although Uzaramo had a very good paddy crop which in normal times might have been expected to yield some 1,500 tons of paddy plus 500 tons of hand-hulled rice, this year's market sales amounted to 194 and 29 tons respectively. It is reasonable to suppose that the balance was either carried into Dar es Salaam each weekend by Africans returning to their normal employment or else was sold in the black market at a price of Shs. 2/- per kilo. There is good reason to believe the report that many natives of Morogoro District walked with head-loads of rice to Maneromango whence they travelled by lorry to the environs of Dar es Salaam and sold their rice at Shs. 2/- per kilo and returned to their homes rejoicing.

A further feature which added to the depressingly low marketable surpluses in various markets was the peculiar system whereby at markets in Handeni District, situated about eight miles from the Tanga Line, prices for maize and paddy were approximately fifty per cent higher than for markets in Morogoro District situated at a similar distance from the Central Line. Morogoro natives not unnaturally thought that Government and the traders were combining to cheat them of their just dues and

sold considerable quantities of their produce at markets over the border, which resulted in a disappointing return for endeavours made on this side of the border. Nevertheless the province succeeded in producing a marketable surplus of 28,500 tons of foodstuffs, as detailed in annexure I to this report. This total includes 6,600 tons of non-native maize, the bulk of which was produced on sisal estates for home consumption.

FOOD CROPS IN GENERAL

	Sales in Tons				
	1943	1944	1945	1946	1947
Paddy	7,040	6,894	780	427	6,030
Hand-hulled rice	964	890	178	123	414

Bumper crops were harvested in all districts but shortage of bags and transport, sales in the black market and over the border resulted in less than the normal surplus being sold in the district markets. Had marketing conditions been similar to those existing prior to 1939 it is safe to say that the paddy crop would have exceeded 10,000 tons.

	Production in Tons				
	1943	1944	1945	1946	1947
Maize	5,548	8,767	4,369	1,920	*12,347

*Inclusive of non-native production.

There was a bumper season throughout the province except in some areas where water-logging occurred or where field mice destroyed the crop just before harvest. Early in the year, with the assistance of the Tanganyika Cotton Company, 225 tons of Kenya maize seed were imported in order to enable planters in Morogoro and Kilosa districts to replenish their stocks of seed or make a start with good seed. This assistance undoubtedly helped to produce such a satisfactory tonnage though it should be noted that the figure shown above includes maize grown by sisal and other estates and retained for consumption on the estates. Several hundred tons of maize remained in the growers' hands owing to shortage of gunnies, lack of lorry transport and the inability of the Tanganyika Railways to accept deliveries of Ulanga and Bagamoyo maize at Kilosa and Ngerengere stations. Markets in several districts had to be closed for long periods during the marketing season with consequent dislocation of the marketing arrangements. The failure of the new Ruvu pontoon at Bagamoyo added to that districts' difficulties.

	Sales in Tons				
	1943	1944	1945	1946	1947
Sorghums	963	2,725	512	103	1,333

Considering the bumper maize and paddy crops and the extensive beer drinking that was indulged in, it seems remarkable that so much sorghum should have been sold in the district markets.

	Sales in Tons				
	1943	1944	1945	1946	1947
Mixed Beans	554	900	265	101	341

In the mountain areas of Kilosa and Morogoro the heavy rains experienced in June caused "damping off" in many fields.

	Sales in Tons			
	1944	1945	1946	1947
Cowpeas	224	81	80	298
Green Gram	7	169	16	120
Pigeon Pea	155	114	22	1,925

A record crop was sold on the markets due to there being a surfeit of cereal crops combined with the high prices offered by traders (32 to 35 cents per kilo). The bulk of the crop was reported to be destined for India.

	Sales in Tons				
	1943	1944	1945	1946	1947
Onions	110	129	168	153	89

The actual crop amounted to more than the 89 tons marketed, as a drop in prices during December has caused many growers to store their crop in the hope of a subsequent rise in prices.

	Sales in Tons				
	1943	1944	1945	1946	1947
European Potatoes	265	55	17	222	82

"Late Blight" (*Phytophthora infestans*) destroyed almost the entire crop of European potatoes in the Ukaguru mountains of Kilosa District, which accounts for the decrease in production during 1947. A supply of blight-resistant "seed" has been promised by the Senior Agricultural Officer, Lushoto, and this will be purchased and multiplied with the aid of Native Treasury funds during 1948.

	Sales in Tons				
	1943	1944	1945	1946	1947
Vegetables	600	665	724	773	700

Production in Morogoro District dropped by nearly 100 tons and it is thought that this is partly due to native growers relying too much on "home-grown" seed. The demand for seed retailed by the department, on behalf of the Native Treasury, is increasing and it is hoped that production will expand considerably in 1948. There is scope for the establishment of a thriving Co-operative Vegetable Growers' Union in Morogoro District, but it will require the whole-time services of an officer to organize it during the initial stages.

ROOT CROPS

	Sales in Tons				
	1943	1944	1945	1946	1947
Cassava	1,400	259	1,368	155	470

These yearly figures bear no relation to the area under this crop or the actual production, for much of the crop may be purchased by itinerant natives from growers, particularly in Uzaramo. In 1944 and 1946 stocks of mature cassava in Uzaramo and Bagamoyo were seriously depleted by food shortages in neighbouring districts. In 1947 much more cassava would have been sold if steps had not been taken to ensure the building up of adequate reserves of mature cassava in both Bagamoyo and Uzaramo. The reserves of cassava (and sweet potatoes) in Bagamoyo, Uzaramo and Northern Rufiji are considered to be the best seen for many years. Good reserves have also been maintained in Kilosa and the mountain regions of Morogoro, though not without considerable pressure by the instructor staff. In the plains of Morogoro District there are areas where neither cassava nor sweet potatoes will thrive. At Ngerengere the subchief and the agricultural instructor have abandoned root crop cultivation in favour of a communal grain field the produce from which will be stored against an adverse season.

NATIVE CASH CROP

	400lb. bales				
	1943	1944	1945	1946	1947
Cotton	9,822	5,100	4,780	6,224	6,631

A most disappointing season for in spite of a fifty per cent increase in acreage and good climatic conditions the crop only approximated that of the previous season. Up to the end of June there was every prospect of the crop reaching 10,000 bales but widespread attacks by American bollworm (*Heliothis armigera*) seriously reduced the bottom crop and a plague of field mice played havoc with the crop later in the season. These attacks were all the more unfortunate in view of the unusually small proportion of stained cotton which occurred throughout the province.

The price paid to growers varied from 32 to 42 cents per kilo of seed cotton according to the distance of the buying posts and the ginneries from the railway.

The serious losses caused by American bollworm were clearly demonstrated at Ilonga Experimental Station where cotton growing in proximity to the maize blocks produced a negligible crop whilst cotton growing a few yards farther away produced a crop of over 1,300 lb. per acre. The importance of obtaining control over the insect pests on cotton can hardly be over-emphasized.

	Sales in Tons				
	1943	1944	1945	1946	1947
Copra	5,161	4,663	5,448	4,637	2,139

The Senior Agricultural Assistant, Bagamoyo, reports that "coconuts in general had a poor season mainly due to the fall of nuts in the young stage. The south-east monsoon was above average in velocity and duration and so were the April-May rains. Inflorescences appeared to be normal and young fruit set well but after one to three months heavy falls occurred. . . . Nut yields were normal during the first quarter, down to 60 per cent in the second, 40 per cent in the third and 30 per cent in the last quarter. Nuts being in short supply in Dar es Salaam during the festival of Ramadhan, appeals were made from that quarter for supplies from Bagamoyo. Immediately permission had been granted to export nuts to Dar es Salaam prices rocketed from Shs. 26/- to Shs. 100/- per thousand with the result that very little copra has been made since August. Latest indications are down and copra making on the upgrade."

The Agricultural Assistant, Utete, reports that a considerable proportion of the crop from the Delta region was sold in Kilwa and Mafia where the price was reputed to be slightly higher.

Figures of nut production on the government coconut plantations at Bagamoyo clearly indicate that, given a normal season, the production of copra can be doubled over a period of two years provided a few elementary principles of plant sanitation and cultivation are adopted. If similar measures were to be adopted throughout the province it is reasonable to suppose that the production of copra could be similarly increased. One cannot help feeling that if a fraction of the staff, funds and equipment expended on the groundnut scheme were to be spent on copra improvement the Ministry of Food would reap a very handsome reward in a short space of time. This province could produce an extra 2,500 tons of edible coconut oil within two years, given the necessary staff and equipment to cope with some thousands of idle, recalcitrant, coconut plantation owners.

Coconut Sanitation.—Native Authority Coconut Plant Sanitation Rules were introduced simultaneously in Bagamoyo, Uzaramo and Rufiji with a view to enabling more effective action to be taken by the instructor staff against native offenders. Similar rules already existed in Mafia Island. The results were very satisfactory in both Bagamoyo and Uzaramo but less so in Rufiji where the Native Authorities remain apathetic. The felling of dead and diseased palms can be achieved moderately easily but considerable difficulty is encountered in getting owners to bury the trunks and remove the stumps. The importance of burying or burning a dead palm trunk can hardly be over-estimated for a count of larvæ and pupæ showed that from twenty to over a hundred could be found in a single dead palm.

Copra Improvement.—Little progress was possible owing to the fantastic prices paid for fresh nuts. Thieving was rife and records on the government plantations at Bagamoyo were largely spoiled by thefts.

	Sales in Tons				
	1943	1944	1945	1946	1947
Sesame	531	606	523	224	201
Cashew nuts	—	463	347	218	348
Arrowroot (Tacca starch) ...	243	134	153	3	121
Beeswax	25	10	4·5	10	6
Charcoal	—	1,155	1,269	1,107	1,925

These figures refer only to charcoal sold in markets of Uzaramo District. A lot of trees are being burned annually in Uzaramo.

	Sales in Tons				
	1943	1944	1945	1946	1947
Gum copal	81	65	22	57	59
Raffia Fibre	17	66	67	75	84

The popularity of this crop amongst the Wazaramo appears to be increasing.

	Sales in Tons				
	1943	1944	1945	1946	1947
Kapok	102	66	95	220	220
Castor seed	90	131	268	342	698

Almost the entire crop is produced in the dry areas of Northern Kilosa. Production has been stimulated by prices ranging from 35 to 53 cents per kilo.

Groundnuts.—The Senior Agricultural Assistant, Kilosa, reports that ". . . in the past 80 to 100 tons of nuts were brought over the border from Mpwapwa and sold in Kilosa markets, but this year the groundnut scheme has been offering higher prices and our production has fallen to three tons."

NON-NATIVE AGRICULTURE

Sisal.—This continues to be by far the most important form of estate agriculture in the province. Production during the year fell by 2,246 tons to 32,579 tons, owing to shortage of machinery and labour, and the fact that much of the sisal areas planted in 1945 have not yet come into production whilst areas of old sisal have gone out of production. There is every reason to believe that the 1948 crop will at least equal that of 1946 and may even surpass it.

Sugar cane.—The area under this crop has expanded considerably during the past two years and though accurate figures of production are not obtainable it is thought that the gross production exceeds 3,000 tons annually.

Maize.—The acreage of maize grown on estates was approximately as follows:—

	Acres
Kilosa	8,935
Morogoro	7,658
Uzaramo	957
Other districts	450
Total ...	18,000

This year Government gave planters the option of (a) selling their maize crop at Shs. 21/- per bag of 200 lb. or (b) taking an acreage grant of Shs. 32/- per acre and selling their crop at Shs. 13/50 per bag.

The total amount paid to planters, mainly sisal estates, in the form of acreage bonuses amounted to approximately £18,500. The yields of estate maize per acre average—5½ bags in Kilosa; 3½ bags in Morogoro; ½ bag in Uzaramo. These yields per acre compare unfavourably with 8½ bags at Morogoro farm and 10 bags at Ilonga Experimental Station. On too many estates preparation of the land is carried out too late in the season, too heavy a seed-rate and too heavy a stand are commonly practised, and weed-growth is allowed to compete very seriously with the crop. Lack of capital, agricultural knowledge and mechanical implements together with the poor quality and unreliability of local labour are all factors which contribute towards low yields also.

Cotton.—The Senior Agricultural Assistant, Kilosa, reports that non-native cotton cultivation has received a great impetus owing to the fact that planters' seed-cotton can be sold ungraded. Insistence on grading had made the cost of production

prohibitive for planters except when the crop was exceptionally clean. In effect the selling of their cotton ungraded is equivalent to a considerable increase in price and non-native cotton cultivation is likely to expand somewhat though the chronic shortage of labour will still remain the limiting factor.

Rubber.—Sanje estate containing 170 acres of Hevea rubber was leased from Government by Mr. J. S. J. McCall towards the end of 1946. By using half the war-time force of tappers and tapping each tree on alternate days for ten months only in each year he has produced considerably more latex per tree than the estate produced under Rubber Control. Production for 1947 amounted to:—

Smoked sheet lb.	Bucket washings lb.	Cup lump lb.	Tree scrap lb.	Total lb.
83,933	8,638	5,897	4,858	103,326

This supports the insufficiently observed axiom that "You can't get something for nothing from Nature". The quality of the first grade ribbed smoked sheet produced on the estate has met with very favourable reports from brokers in London who considered it superior to "Malay No. 1". Costs of production are lower than on estates in Malay and with careful management the estate should become an asset to the Territory instead of lying derelict as it did for so many years.

PESTS AND DISEASES

American Bollworm (*Heliothis armigera*).—American bollworm devastated the "bottom crop" of cotton in many parts of the province. This pest continues to be the most serious cause of annual loss to cotton growers.

Field Mice.—A plague of these pests occurred on a phenomenal scale throughout the Kilosa, Morogoro and Rufiji districts. In the words of the Senior Agricultural Assistant, Kilosa: "Barium carbonate, paraffin tins and earthenware pots half-filled with water and trench-digging all proved very effective, but the numbers and intensity of the outbreaks, were such that no preventitive action could make much difference. Areas were swept clean of cotton, cassava, pigeon pea, pawpaw and maize." The writer saw a field of 150 acres of standing maize in which every cob had been stripped of its grains by the myriads of mice which swept through the area. The provincial stock of 12 cwt. of barium carbonate was exhausted in a very short time and, though very effective as a means of destroying field mice, was quite inadequate for dealing with such an outbreak. The Agricultural Instructor at Kisaki reports that in the Duthumi-Dakawa-Kisaki area 35,000 mice were destroyed by means of water traps and trenches yet the plague continued.

Brown Streak of Cassava.—First recorded outbreaks were found in Bagamoyo, Kilosa and Ulanga. On the farm at Morogoro the Dihanga mosaic resistant variety from Bagamoyo has developed "Brown Streak" after three years' multiplication and selection for resistance to "mosaic". This was very unfortunate for a large supply of mosaic-tolerant planting material had been built up for wide-scale distribution in Morogoro and Dodoma districts.

Coconut Beetle.—The campaign against this pest was carried out during the dry season with considerable success in Bagamoyo and Uzaramo but with less success amongst the enervated Warufiji. However, a start has been made and in time the situation should improve.

Elegant Grasshoppers.—These again caused considerable damage to pulses and cassava in many areas. The Senior Agricultural Assistant, Bagamoyo, reports that "for years the natives of north-western Uzigua have been complaining of the damage to young crops, including cassava plants in all stages, caused by elegant grasshoppers. Investigations show instead of killing off the pest they are actually nurturing it. . . . as soon as the females are in a gravid state they collect the males and use them as food and leave the females to supply the next crop of males in the following season."

Ascochyta Sorghii.—This disease accurred for the first time on record in Morogoro and Kilosa and caused considerable losses in sorghums in the seedling stage.

Vermin.—Pigs, baboons and hippo took a heavy toll of natives' crops in all districts. Early in the year a poisoning campaign was carried out in the Uzaramo by trained agricultural instructors with very good results, 850 pigs and a number of baboons being accounted for at no cost beyond the price of 30 lb. of arsenious oxide. The Senior Agricultural Assistant, Kilosa, carried out a most successful campaign against baboons in western Kilosa and hundreds of deaths resulted. In December a similar campaign was carried out by the temporary crop supervisor in the Ruaha-Ifakara area with marked reduction in the number of baboons. The poison used in this case was "Tixol" cattle dip which if mixed in the right proportions is every effective; but success also depends on the baboons being short of food, as they tend to be at the end of the dry season, when hunger overrides their normal suspicions of any bait that is put down for them.

In many areas hunts are also organized by the native authorities, but with indifferent results owing to the natives failing to turn out in sufficient numbers. The following kills were recorded in Uzaramo and Bagamoyo districts:—

Pigs 1,469; Baboons and monkeys 1,265; Hippo 17.

The total bag of hippo shot by the Game Department amounted to 680.

GOVERNMENT COCONUT PLANTATIONS AT BAGAMOYO

All government coconut plantations in the vicinity of Bagamoyo were taken over by this department with effect from 1st January, 1947, as a result of the remarkable improvement that took place in the three plantations taken over in 1945 and 1946.

The Senior Agricultural Assistant, Bagamoyo, reports as follows:—"All plantations now in our charge have been cleared of all bush, 335 dead and diseased palms felled and buried and two weedings made around bases of palms.

Production

	No. of palms picked	No. of nuts
1st picking—March...	8,835 ...	111,371
2nd picking—June	6,744 ...	63,759
3rd picking—September	5,719 ...	38,285
4th picking—December	4,973 ...	31,489
Total ...	26,271 ...	244,904

Revenue

	Sales					
	Nuts Amount		Copra Amount		Total Amount	
	Shs.	Cts.	Shs.	Cts.	Shs.	Cts.
1st picking	3,691	83	602	08	4,293	91
2nd picking	4,050	12	—		4,050	12
3rd picking	3,214	44	—		3,214	44
4th picking	2,645	61	—		2,645	61
Total ...	13,602	00	602	08	14,204	08
Add Balance 1946 crop sold in 1947	2,330	24	1,415	50	3,745	74
Grand Total Shs. ...	15,932	24	2,017	58	17,949	82

Estimated Revenue Shs. 18,700/31.
Actual Revenue Shs. 17,949/82.

Revenue not up to estimate due to low yield of nuts after first quarter of the year as explained under heading Coconuts and Copra.

At the end of last season fifteen were selected as possible mother palms for seed purposes when required. When the kiln is in working order again the nuts from these palms will be tested for quantity and quality of copra. The following table gives nut yields of these palm.

Palm No.	Pickings				Total nuts	Average No. nuts per picking
	1st	2nd	3rd	4th		
1	26	31	16	13	86	21·50
2	22	14	12	8	56	14·00
3	17	18	13	45	93	23·25
4	19	18	19	23	79	19·75
5	26	22	13	32	93	23·25
6	79	29	19	41	168	42·00
7	21	22	5	15	63	15·75
8	39	26	6	5	76	19·00
9	87	29	4	—	120	30·00
10	48	33	10	15	106	26·50
11	30	39	22	13	104	26·00
12	?	10	18	2	30	10·00
13	?	18	16	17	51	17·00
14	30	24	13	26	93	23·25
15	18	9	28	11	66	16·50
	462	342	214	266	1,284	

Average per picking per palm 21·83 nuts."

It is of interest to note that:—

(i) Though this was an exceptionally bad season and the first year in which many of the palms had been subjected to proper field sanitation for many years yet the average yield per palm on the government plantations was 29 nuts approximately.

(ii) Bearing in mind the above, it is also of interest to note that whereas the rental received from the plantations had dwindled to Shs. 5,000/- per year by 1944, the revenue accrued during 1947 amounted to Shs. 17,949/82 in return for an expenditure of Shs. 4,943/76—a net increase in revenue of Shs. 8,000/-.

(iii) The results of pickings from the selected mother palms are remarkable in view of the poor season experienced. Some very interesting data should be forthcoming in a few years time provided these records are maintained and are not spoiled by thefts. From this year's records it would appear that palms giving a high yield of nuts do so either by one exceptionally good yield per picking (e.g. Nos. 6, 9 and 10) or by a fairly even yield at each of the four pickings in the year (e.g. Nos. 5, 11 and 14). The latter type of palm would be a better commercial proposition provided the yields were equally good.

SOIL CONSERVATION

(i) *Ulanga District.*—See page 86 above regarding the organization and training of the soil conservation team.

(ii) *Kilosa District.*—Work has been directed towards the control of grass fires in the mountains, the preservation of riverine vegetation and forests in important catchment areas.

(iii) *Morogoro District.*—The Agricultural Officer reports as follows:—"In view of the £50,000 which have been allocated to the District for the rehabilitation of the mountain areas the progress made during the year must be considered disappointing. The main obstacle to progress was the shortage of staff with which to carry out an agricultural economic survey in the mountains.

Routine work of measuring contours was continued by all instructors in the mountain areas. Good progress was made with grass contours in the Morogoro River Valley and with the establishment of banana contours in the Mkindu and Liwale valleys of the Nguru mountains. Elsewhere the progress has not been exceptional. The main difficulty has been to get the natives to look after a contour once it has been established. The total number of convictions for offences of this nature was 183, which speaks well for the energy and efficiency of the agricultural instructors.

During the year the writer carried out surveys in three areas of the mountains, i.e. Morogoro River Valley, the Nyingwa area and the Tangeni Juu area."

GRAIN STORAGE

In close co-operation with the Entomologist, the inspection and treatment of all produce delivered to the Produce Control godowns at Morogoro, Kilosa and Kimamba was successfully introduced this season. At the commencement of the season all planters' and buyers' groups were circularized to the effect that all produce delivered to the Control would be accepted subject to its being dry, clean and free from weevils. At district markets clerks and instructors applied the "thumb-nail test" for all deliveries of maize and parcels of damp or weevilly maize were rejected before being purchased. At the Economic Control Board godowns trained instructors examined every bag before admission to the godown and rejected all bags containing damp, weevilly or dirty produce. Planters and traders had a right of appeal to a European officer of the Agricultural Department and, where necessary, moisture determinations for disputed consignments were carried out on the Brown Duval moisture test. In every case the rejections made by the instructors were found to be justified. After acceptance each bag was dusted externally with 0·5 per cent Gammexane and stacked. In order to be fully effective Gammexane should be mixed with the grain but this is not permissible neither is it possible with the existing system of storage. The godowns were disinfested initially and there has been no need to repeat the process during the season as the Gammexane has kept all storage pests in abeyance. Monthly examinations of samples taken from maize stored at Morogoro show that after five months storage 21 per cent of the bags contain a considerable number of weevils, 42 per cent contain a few weevils and 37 per cent still free from weevils. The maize which contained a "considerable number of weevils" was and still is fit for human consumption and is far better than normal trade maize. It is safe to say that had it not been for the introduction of these measures much of the 3,000 tons of maize stored at Morogoro would have been unfit for human consumption before the Produce Control required it for distribution. In a year when food is in short supply protection during storage is less important, for the turnover of stocks is rapid and losses during storage are less apparent. In years of plenty when stocks of food accumulate and have to be held for a considerable time the losses from grain storage pests reach very serious proportions. The application of Gammexane dust to the outsides of the bags prior to stacking results in the destruction of weevils and grain moths which are already on the bags, or which subsequently alight on the bags, or which come to the surface from within the bags, as grain weevils do during their life cycle. So that although external dusting of the bags does not afford the complete protection that would be achieved by internal dusting, it does afford a very reasonable protection to grain which is clean and dry.

Finally, I would like to take this opportunity of recording my appreciation of the assistance and co-operation so readily afforded by members of the Provincial Administration stationed in the province.

A. H. Savile,
Senior Agricultural Officer
Eastern Province

SUMMARY OF AGRICULTURAL PRODUCE SOLD DURING 1947

(in metric tons)

Produce	Price per ton to producer	Ulanga	Kilosa	Morogoro	Bagamoyo	Uzaramo	Rufiji	Mafia	1947	Approximate value to producers	1946	1945	1944	1943
Food Crops	£									£				
Beans, mixed ...	15	21	310	10	–	–	–	–	341	5,115	101	265	900	554
Cashewnuts ...	18	..		.	–	174	–	174	348	6,264	218	347	463	–
Cassava	7			475			45		470	3,290	155	1,386	259	1,400
Cowpea	10	21	27	29	41	147	33	–	298	3,320	80	81	224	–
Green Gram ...	12	2	6	–	4	73	35	–	120	1,500	16	69	7	–
Groundnuts ...	18	–	3	–	–			–	3	72	–	–	–	–
Jaggery	27	400	2,000	200	–		50	–	2,250	60,750	1,100	730	463	372
Maize, Native ...	7	552	2,895	1,084	663	553	–	–	5,747	40,230	} 1,920	4,369	8,767	5,548
Maize, Non-Native	11	–	5,000	1,500	–	100	–	–	6,600	55,000				
Onions	25	–	60	29	–		–		89	2,225	153	168	129	110
Potatoes	20	–	25	57	–	–		–	82	1,640	220	17	55	265
Pigeon Pea... ...	18	8	–	41	109	1,306	461	–	1,925	34,250	22	114	155	–
Paddy	9	2,665	31	10	21	195	3,108	–	6,030	54,270	427	780	6,894	7,040
Hand-hulled rice ...	17	180	113	71	5	29	16	–	414	7,038	123	178	890	964
Tacca starch ...	17	–		–	–	112	9	–	121	2,057	3	153	134	243
Sorghum	6	–	339	550	15	205	24	–	1,333	8,000	103	512	2,725	965
Vegetables ...	15	–	300	408			–	–	708	10,500	773	724	665	600
Salt	5	–		..	1,823	–	–	–	1,829	9,145	2,682	1,626	2,944	–
Total ...	-	3,849	11,109	4,456	2,678	2,894	3,779	174	28,008	304,666	8,139	11,607	25,801	–
Oil Crops														
Castor seed ...	25	–	691	6	1	–	–	–	698	17,450	342	268	131	90
Copra	26	–	.	–	545	481	321	784	2,139	55,612	4,637	5,448	4,663	5,161
Sesame	18	2	15	27	30	71	56	–	201	3,618	224	523	606	531
Lemon grass ...	650	–	–	10	–	–	–	–	10	6,500	9	–	–	–
Total ...	–	2	706	43	576	552	377	784	3,038	83,180	5,203	6,241	5,400	5,782

SUMMARY OF AGRICULTURAL PRODUCE SOLD DURING 1947 (*contd*).

(*in metric tons*)

Produce	Price per ton to producer	Ulanga	Kilosa	Morogoro	Bagamoyo	Uzaramo	Rufiji	Mafia	1947	Approximate value to producers	1946	1945	1944	1943
Other Crops	£									£				
Beeswax	350	0·2	1·7	2	1·3	0·5	0·3	–	6	2,100	10	4	10	25
Gum copal ...	40	–	–	–	7	40	12	–	59	2,360	57	27	65	81
Kapok	125	–	50	170	–	–	–	–	220	27,500	220	95	66	102
Raffia	60	–	–	–	–	84	–	–	84	5,040	75	67	66	17
Para rubber ...	93	46	–	–	–	–	–	–	46	4,200	–	–	–	–
Sisal	868	–	12,356	13,589	70	7,509	50	–	32,579	1,885,000	34,825	33,985	31,717	26,808
Seed cotton ...	20	1,041	913	780	548	42	602	–	3,926	78,000	3,615	3,080	4,830	5,500
Total ...	–	1,087	13,320	14,539	625	7,675	664	–	36,920	2,004,200	38,802	37,258	36,754	32,543
Forest Products														
Charcoal	25	–	–	–	–	*1,925	–	–	*1,925	–	1,107	1,269	1,155	–
Mangrove bark ...	11	–	–	–	–	–	†2,000	–	†2,000	–	3,134	1,309	1,451	–
Mangrove poles ...	–	–	–	–	–	–	†7,000	–	†7,000	–	19,198	8,825	10,087	(in score)
‡Sawn timber ...	35	104	105	4,369	12	895	2	–	5,487	–	–	–	–	–

*Plus 33⅓ per cent for illicit sales outside Native Authority markets. †Estimated on returns to end of September. ‡1 ton = 60 cubic feet.

EASTERN PROVINCE COTTON STATISTICS, 1947 SEASON

District	Ginnery	Seed Cotton in Tons							Cash paid to Native growers	Lint production in 400lb. bales			
		Native		Non-Native									
		A	C	A	Crop	C	Total	%C	Shs.	A	Crop	C	Total
MOROGORO:	Morogoro	72	11	} –	102	–	272	13	}	243	174	54	471
	Turiani	71	16					18					
	Duthumi	270	52	–	–	–	322	16		455	–	96	551
	Mikesse	77	25	4	7	2	115	25		130	24	45	199
	Ngerengere	56	15	–	–	–	71	21		93	–	27	120
	Total ...	546	119	4	109	2	780	–	233,479	921	198	222	1,341
KILOSA:	Rudewa	132	34	–	102	–	268	20		218	182	61	461
	Kilosa	394	79	–	83	–	556	17		678	146	144	968
	Msowero	73	16	–	–	–	89	18		120	–	26	146
	Total ...	599	129	–	185	–	913	–	259,750	1,016	328	231	1,575
BAGAMOYO:	Mandera	473	69	6	–	–	548	13	192,873	799	–	129	928
ULANGA:	Kiberege	245	19	–	–	–	264	7		417	–	28	445
	Malinyi	652	125	–	–	–	777	17		1,074	–	188	1,262
	Total ...	897	144	–	–	–	1,041	–	349,528	1,491	–	216	1,707
RUFIJI:	Logeloge	74	32	–	–	–	106	30		120	–	54	174
	Kilimani	227	34	–	–	–	261	12		374	–	55	429
	Msomeni	215	20	–	–	–	235	9		369	–	35	404
	Total ...	516	86	–	–	–	602	–	207,165	863	–	144	1,007
UZARAMO:	Ngerengere	30	12	–	–	–	42	28	13,677	50	–	23	73
	GRAND TOTAL ...	3,061	559	10	294	2	3,924	–	1,256,472	5,140	526	965	6,631

Morogoro Farm Report 1947

INTRODUCTION

Critical experimental work at the station was of necessity severely limited owing to staff shortages and preoccupation with district and production committee activities. Work was concentrated on the maintenance of varieties (cassava, sweet potatoes, short term sorghum and bananas), the provision of occular demonstrations of improved cultural techniques, the sale and distribution of planting material and the supply of fresh milk to the European community in Morogoro.

NURSERIES

(a) The demand for budded fruit trees and ornamental plants remained very heavy. Orders were received from nearly all parts of the Territory and were supplied to the following extent:—

	Sold	Issued Free	Total
Citrus plants	2,486	... 253 ...	2,739
Other fruit trees	1,239	... 328 ...	1,567
Ornamentals	2,176	... 215 ...	2,391
	5,901	... 796 ...	6,697

Canna corms	16 bundles.
Maize seed (selected)	17 bags.
Panicum maximum	6 crates.
Cassava (mosaic and brown streak tolerant varieties)	156 bundles.
Lemon grass...	16 crates.
Sorghum	13 bags.
Cowpea	100 kilos.
Gram	24 kilos.
Sweet potatoes	1 bundle.

(b) *The Citrus Orchard.*—An unidentified disease assumed serious proportion in the mature citrus orchard at the farm. The symptoms were those of a chlorosis in the leaves, a tendency for the bark of the stock to harden and peel off with slight signs of gummosis and a die-back of branch extremities. The chlorosis appears to take two forms. One is typically a diffuse mottling with the leaf veins indistinct—the chlorosis having spread to the leaf veins. In the other the veins are green with the chlorosis extending between them. This latter the Plant Pathologist described as being typical of zinc deficiency, but on spraying with zinc bordeaux no improvement was noticeable.

In addition to treatment with zinc bordeaux the trees were also sprayed with borax, bordeaux mixture, iron peroxide and potassium permanganate on the assumption that the symptoms might be due to a soil trace element deficiency. However, these treatments, and other cultural and manurial treatments were equally ineffective.

The seriousness of the disease must be judged not only by the fact that our own orchard is threatened with extinction but also that trees distributed from Morogoro may be carriers of the disease to other parts of the Territory. In fact the writer (Agricultural Officer, Morogoro) has seen similar symptoms at the Mhonda Mission, Turiani, where the trees were stated to have originated from Morogoro.

(c) *Extension of Citrus Nurseries* —Many of the old citrus beds, which have been growing stock for about fifteen years were rested during the year and replaced by new areas.

DAIRY

During the year the total milk production was 3,861 gallons of which 2,576 gallons were distributed as whole milk to customers and the balance fed to calves. The average yield per cow (computed by dividing the total production for the year by the average number of cows in milk per month or portion of a month) was 182 gallons. During 1946 and 1945 the comparable figures were 181 and 167 gallons respectively.

The health of the herd remained good but was only maintained by routine dipping against east coast fever and weekly blood slide examinations combined with "Stibophen" injections for the prevention of trypanosomiasis. In all 167 injections were given during the year. There was only one case of abortion which in comparison with previous years was a great improvement.

CROPPING

(a) *Silicophosphate Trial.*—A silicophosphate trial carried out under a factorial layout using "Katumbili" maize as the indicator crop gave non-significant results.

(b) *Cassava Varieties.*—The Dihanga cassava variety, which had been obtained from Bagamoyo as a mosaic and brown streak resistant variety and which has been multiplied at the farm for three years, succumbed to brown streak disease during the year. A sample was sent to the Plant Pathologist, Lyamungu, who replied that it should not be distributed to natives.

Twelve Amani seedling varieties were maintained. Most of these appeared more resistant to the two virus diseases than the local variety and one, Amani 4026/20, seemed completely immune.

(c) *Alternate Husbandry.*—At the bottom end of the farm the rotational system of three years arable followed by three years grass ley continued to give outstanding results in spite of the arable section being under its third year of cropping. The yields of maize and sorghum obtained were as follows:—

MAIZE:

Block I—Katumbili	885 kgs/acre.
Block II—Durum	805 kgs/acre.
Block III—Eckstein	911 kgs/acre.

These yields should be compared with an average non-native yield in the district of two and a half bags per acre. The plots at the farm received no irrigation or manuring.

SORGHUM:

Block II—Bangala	338 kgs/acre.
Block IV—Karachi	370 kgs/acre.

(d) *Short Term (Uganda) Sorghums.*—These yielded as follows:—

Block	Variety	Yield (kilos)
23 ...	T 1 ...	390
24 ...	T 15 ...	670
25 ...	L 10 ...	492
26 ...	K 6 ...	400
28 (a) ...	T 18 ...	556
28 (b) ...	T 9 ...	390

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Lake Province

STAFF

(a) *European.*—The staff in districts was as follows:—

Mr. N. V. Rounce, Senior Agricultural Officer, Mwanza.

Mr. R. I. Butler, Agricultural Officer (Ginnery Inspector), Mwanza.

Mr. J. T. Purvis, Agricultural Officer, Sukumaland, returned to Musoma from vacation leave on 18th May, 1947, to prepare development plans. On 9th July, 1947, he was transferred to Lubaga, Shinyanga, pending the building of a house for him at Malya.

Mr. T. S. Jervis, Agricultural Officer, Bukoba.

Mr. C. G. Glegg, Agricultural Officer, Mwanza.

Mr. D. H. Drennan, Agricultural Officer, arrived at Mwanza on 18th December, 1947, on first appointment.

Mr. J. H. McGregor, Tobacco Officer, was stationed at Biharamulo from 2nd March, 1947 to 31st December, 1947. Mr. McGregor was off-duty from the 30th June till the 23rd September and made a successful recovery from his illness. During this period, the Agricultural Assistant, Ngara, Mr. Goode supervised the work of the District.

Mr. D. R. A. Goode, Agricultural Assistant, was stationed at Biharamulo from 1st January, 1947, to 2nd March, 1947 when he was transferred to Ngara.

Mr. A. E. Favell, Agricultural Assistant, was in charge of the Coffee Grading Office, Bukoba.

Mr. H. K. von Freeden, Crop Supervisor, Nyamahona, Uzinza, Mwanza District.

Mr. J. W. Savy, Crop Supervisor, Musoma.

SPECIAL STAFF

(a) *European.*—Mr. E. T. Ward took over the Ukiriguru Agricultural Training School on 31st January, 1947.

Mr. J. Hebenton took over the Ukiriguru Agricultural Training School on 27th March, 1947, from Mr. E. T. Ward, who was transferred to Musoma till 27th July when he departed on home leave.

Mr. A. S. Prentice, Senior Scientific Officer, E. C. G. C., took over Ukiriguru Experimental Station from Mr. J. Peat when he went on leave in 1947.

Mr. Tregarthen was Agricultural Assistant at the Experimental Station.

(b) *Asian.*—Mr. de Souza was employed as a clerk on probation and undertook all the work in the office, turn by turn. He spent most time on correspondence.

(c) *African.*—Of the African Agricultural Assistants, Mr. Kapalaga was tranferred to the North Mara District, whilst Mr. Fundikira and Mr. Ishengoma remained in the Maswa and Mwanza districts respectively. Good work has been done in all three districts by these officers.

The provincial office was staffed by Mr. Tung'ande (in charge), Mr. Mkandawire and Mr. Moses (ungraded clerk). Mr. Mwengo (stenographer) departed on leave in October and later resigned.

Four clerks were employed in the districts.

The African Surveyor, Mr. Alan Alban, was stationed at Mwanza and was engaged in mapping and surveying all the year. He surveyed the Shishiyu settlement block by compass and later the Malya Stock Farm for the Veterinary Department.

The field staff comprised 5 recorders on experimental stations, 7 overseers, 7 teachers, 8 graded African instructors, 79 ungraded African instructors, 18 supernumerary instructors ex Ukiriguru and 12 probationers, 9 coffee graders and 133 food production staff. About 170 instructors were employed by the Native Treasury during the year.

Lack of European supervision is having effect on the discipline and behaviour of some of the instructors in districts without departmental representatives. Eighteen instructors from Ukiriguru Agricultural Training School joined the staff in January and another eight joined in December. Reports show that a good proportion of them are settling down.

VISITORS

The honourable the Director of Agricultural Production visited the Lake Province on 28th April on coffee and cotton marketing matters. Other visitors were Dr. Keen, Dr. Worthington, Dr. Wallace, Professor Phillips, Messrs. Ellis and Weston from the Ministries of Labour and Education, United Kingdom, Mr. Holme of Imperial Chemical Industries and Professor Macdonald of the Ross Institute, members of the Salaries Commission, and Mrs. Elspeth Huxley.

GENERAL

The work of the department has been directed to the encouragement of better farming. Outside the routine and extension work of the department, plans for land utilization have taken the lead. With the inception of the Natural Resources subcommittee of the Provincial Committee, the "team idea" has been considerably strengthened. To some extent this is the natural result of this committee having to act as the Sukumaland development team until that body has assembled. Numerous tours were done in company and matters common to the Administration, Veterinary and Agricultural departments discussed and in many cases decided on the spot with the district team. Some of the principles on which the Sukumaland team and district teams should work were laid down and development plans for different districts considered, amended and finally recommended. Fact collection has continued. More reconnaissance of new country has been done this year than in the past. It was not possible to develop the district team idea as much as was desirable owing to the absence of full teams in five of the nine districts. Foundations have been well laid, however, from the top where there is good co-ordination. New marketing arrangements for cotton and for coffee in the Bukoba district were satisfactorily inaugurated.

WEATHER IN RELATION TO CROPS

It was an excellent long planting season and full acreages were consequently planted. Some flooding in mbugas in Sukumaland took place with losses in sorghum, though paddy of course benefited. In Bukoba, however, the torrential rains were too much for the very absorbent soil and considerable losses were sustained. The season was unfortunately prolonged to the detriment of the cotton crop in Sukumaland, but to the benefit of the maize in North Mara where a record crop was produced. More than average yields of grain were reaped everywhere and there were bumper crops of pulse.

DETAILS FROM THE DISTRICTS

(A) FOOD CROPS

In Ngara, the chief trouble with regard to the production of food is that the men are away for half the year in Uganda, and when they return they expect to be fed as if they had never been away. Consequently sweet potatoes, as an example, are harvested long before they are ready. In Bukoba, as a result of pressure during the war, cassava is now regarded as being almost a staple in most areas. Over 400 tons of beans were exported. In Sukumaland yields of food were good in spite of waterlogged mbugas: the excessive supplies of sweet potatoes were particularly noticeable in the northern areas where surplus supplies were sliced and dried for storage.

(B) CASH CROPS

In Biharamulo the tobacco crop amounted to 80 tons with the highest proportion of grade I ever produced. An average of Shs. 2/- per kilogram was received for the tobacco over all grades on resale to the East African Tobacco Co., and the British American Tobacco Co. The Ngara coffee crop amounted to 120 tons at the end of the year but buying still continues. This is the smallest crop for the last four years. The reduction in crop can hardly be laid at the door of the change-over to multiple stem as in most cases only poor trees were cut, and the few trees treated last year are now doing well. The fire-cured tobacco crop of Bushubi was much better in quality this year although it still only amounted to nine tons. The producers like tobacco but do not like the rules, they like to sun-cure it and sell it as coil. The market for coil is limited. It is hoped that payment on delivery may make fire-curing more popular. This year there would have been more growers but owing to a food shortage or for other unknown reasons, people have moved back to Urundi and there are now only 700 growers. Good prices were obtained for the small amount of Pishori rice produced in Ngara district. The coffee crop in Bukoba amounted to 8,450 tons. As regards the prospects for the coming year, the long spell of heavy rainfall which lasted over twelve months seems to have affected the setting of fruit in spite of numerous blossomings. The production of maize exceeded all expectations, amounting to 1,700 tons. The quantity of Soya beans has diminished in recent years, but with the recent increase in price interest may reawaken. Irish potatoes suffered considerably from floods and rotting in store and 228 tons only were sold. Cotton in the Musoma District created another record amounting this time to 3,700 bales. A record crop of 2,500 tons of maize was sold in North Mara. This crop has developed since the beginning of the war. The cotton from the other four districts was less than was expected, due to the prolongation of the rains, particularly in Ukerewe where the crop fell from 5,796 bales to 3,080 bales, in spite of a bigger acreage. The total production for the province was 32,250 bales, 1,000 bales below the average of the last eleven years. The paddy crop was good and sales reached 8,200 tons at the end of the year with more to come in. A full acreage was not planted owing to pessimism developed by a series of bad seasons. Chickpea and cowpea each reached a record of 1,700 tons. Groundnuts sales rose to 2,800 tons, the highest production since 1942 when over 6,000 tons were produced. Shinyanga put more grains, pulses and paddy on the market than for many years, but her cotton production was only 1,775 bales partly due to the emphasis laid on the production of adequate food. Sight must not be lost of the contribution of the Lake Province to alleviating the shortage of vegetable oils with an export of some 7,000 tons of cotton seed in each of the past three years. There has been an increase in the production of sisal by Raspodors on the island of Kome and in Uzinza. About 150 tons were produced. One company has embarked on the cultivation of pawpaw for papain and has farms in Uzinza and close to Mwanza. They are not yet in production. Fifteen tons of beeswax were sold in the Mwanza District. Twenty-nine tons of sunflower seed were issued to districts. Where land is available it is to be planted as a field crop, particularly where ploughs are used, elsewhere it is recommended as a "back-garden" crop for trial in 1948 on a small scale by as many individuals as will take the seed. The price is the same as for groundnuts.

(c) FOOD SHORTAGE

Progress has been made in the Musoma District where food stores of local materials have been erected at each chief's headquarters. The grain is eleusine which will store for many years so renewal is necessary only at long intervals, which is a great advantage. There has been little progress in Sukuma in this respect principally because it was left to the chiefs. Much more stress should be laid on this very necessary measure in the future, for it is feared that so soon as there are a series of good years the need will be forgotten. Recriminations will follow at the time of the next shortage.

(d) IMPROVEMENT OF SEED SUPPLIES

Planting material of the mosaic resistant cassavas from Amani is being multiplied at Ukiriguru. They appear to be extremely promising. The measures which it was suggested in the report for 1946 would be taken in regard to the rice seed supply were in fact undertaken in 1947. Out of the 490 bags of pure seed of the two varieties Kahogo and Kilombero, eighteen were distributed in the Nyanza Federation at the cost of transport and some shortage. It was exchanged for mixed seed which was sold. The two villages which multiplied the seed did it very effectively. There now remains the difficulty of giving the growers a better price for the pure product which is apparently not going to be easy under the existing system of controls. No particular virtues in regard to high yield are ascribed to these two varieties as compared with the individual varieties with which they were compared although Kilombero is a better yielder than Majimaji, though not incomparably so. The fact that they are pure and distinguishable in husk and therefore that all the low-yielding varieties will have been excluded from the Africans' seed supply, will make for a big increase in yield, and the better quality of the paddy will lead to better milling. The Kahogo is a very palatable rice, better than Afaa. One hundred bags were issued in Ukerewe by the trade at their own request, and another twenty bags of Afaa from Ukiriguru were bought by the trade and sent to Majita. The quality of the paddy of the Majita peninsula in the Musoma District has greatly improved as the result of the exchange of pure Afaa paddy in the last two years.

Thirty-six cultivators grew 103 acres of UK46 cotton and produced 31,000 lb. of seed for planting 1,200 acres in the Bugumbikisho peninsula this year. Yields ranged from 1,862 lb. to 183 lb. per acre, with an average of 458 lb. per acre. Not only is the ginning percentage considerably better than of Mz 561 but in seed-cotton yields it exceeded that strain in the seventeen strain trials by twenty-five per cent.

The people of south-eastern Musoma who are always suffering from food shortage reaped good crops from the short-term sorghums supplied to them in previous years and actually praised them for their virtues.

(e) IMPROVEMENT OF FARMING SYSTEMS AND CULTURAL METHODS

Greater attention has been paid to cultural methods for Biharamulo tobacco, and the single leaf method of curing is being introduced. Greater emphasis has had to be laid on better banana culture in the western Lake Province as a result of the growing menace of banana weevil. In Ngara not inconsiderable success has been attained by propaganda and demonstration, followed by pressure without prosecution to thin, mulch and weed the plantations. The sowing of beans in the bananas made possible by the thinning has been encouraged as a measure of further encouragement. In Biharamulo there is much less success but propaganda started later. A new Native Authority rule has been agreed to by the chiefs concerned to mulch bananas with the sorghum straw of the adjacent fields. This area is marginal for bananas, which is an exceedingly useful crop in an area prone to shortage of food, but only careful husbandry can lead to satisfactory yields. The Agricultural Assistant has paid a lot of attention to the pruning and care of the coffee crop since his transfer there. Conversion to multiple-stem was undertaken throughout Bushubi where the crop was in a moribund condition. Over 50,000 trees were treated. In Bugufi activity has been confined to the roadside fields where 17,000 trees have so

far been converted. Abnormal rains in Bukoba, which have extended and altered the times of coffee-picking, have prejudiced some of the growers against mulching with grass, to which they attribute the above. The response to the drive for the application of more manure on the fields of Usukuma has been better this year, principally in South Maswa and South Shinyanga, and the Nyanza and Usega federations in the Mwanza District. Rotation of cotton with grain is now being practised by a few, though little success was obtained in changing over the permanent second grain field to a permanent cassava field. Propaganda continues.

(F) SOIL CONSERVATION AND SOIL FERTILITY

There has been a slight lag in soil conservation measures in Ngara and Biharamulo owing to the concentration on the culture of the coffee, tobacco and banana crops, but works which existed have been maintained. The mulching of coffee with grass is a measure of soil conservation practised both in Ngara and Bukoba. In Musoma tie-ridging has advanced in certain chiefdoms much more quickly than elsewhere particularly where the native authorities are strong. Soil erosion gangs were maintained demarcating hilltops and planting up sandy river beds to good effect in Majita. The Crop Supervisor was in charge of this work and that of bunding the rice fields. More attention is being paid to grass strips in plough land than in the past, both in North and South Mara. The half acre per homestead of tie-ridging was not well done in Sukuma as a whole. They like to put the ties in afterwards when there is less work to do, but half the value of the measure is then lost. The opinion of those who normally plant on the flat in Shinyanga who obeyed the tie-ridge instruction was that it reduced weeds and facilitated weeding. This of course applies equally well to the ordinary ridge. The measure is slowly gaining ground but much more slowly than was expected and far too slow for the needs of the situation. In the 1947-48 season the order is half an acre per householder at the beginning of the rains and another half acre at weeding time. In spite of the promise of an ox as a prize in five chiefdoms, only two chiefdoms produced work worthy of a reward. The fields of 2,500 people in the special "ibushi" area of south-eastern Shinyanga were marked out for grass strips five yards wide at intervals of thirty yards by a gang of instructors, and under the supervision of a Development Officer seconded to this work. *Cenchrus* seed was issued for planting in these grass strips in one village. Similar grass stripping of 1,000 fields was undertaken by the African Agricultural Assistant, Maswa, in that part of south-eastern Maswa abutting on the above area. Approval of the new plough rules is still awaited. A composite set of soil conservation rules for Sukuma were submitted for approval to replace those existing for each district. New sets of rules were approved for Ngara, Biharamulo and Musoma and North Mara.

(G) ERADICATION OF WEEDS

The flooding of sorghum fields discouraged weeding of *Striga*. The eradication of *Vinca* continues in Ukerewe and Ukara. *Opuntia* has been dealt with too where necessary in Mwanza District. In North and South Mara it is too big a problem to be dealt with by hand without reducing labour available for other works, and the Entomologist is studying ways and means of dealing with it biologically, though not with much optimism. *Aristida* is being tackled more thoroughly now that an African Agricultural Assistant has been posted to North Mara. Certain simple observations are being taken and a map of its distribution is being made. Methods of eradication are being investigated on the Native Treasury Farm.

(H) WATER CONSERVATION

As, to a great extent, the provision of water is the means of invitation to the new land much attention has been paid to the surveying of new areas for sites for water points. Some of this work has been done by the Agricultural Officer, Mwanza, and the African Agricultural Assistants, by the Crop Supervisor in Uzinza, and also by the Temporary District Foreman, P. Fadden, who made a number of visits to Uzinza. This information is slowly being gathered together for the Sukumaland team. In

addition, there was a gang of labourers attached to the African Agricultural Assistant (Mr. Kapalaga) in the Nyanza Federation excavating rice ponds, digging furrows to fill them, and generally holding up surplus water for utilization in rice cultivation. A list of future sites was also made. This assistance was appreciated by the people and it was unfortunate that it could not be carried out in the dry season as it is thought that the people would have co-operated after harvest in giving free assistance. Three hafirs were dug in the Mwanza District, two in Maswa, three were partly excavated in Kwimba and another two in Shinyanga District.

I cannot do better than quote from the report of the Agricultural Officer, Bukoba, on the success of the damming of the Ikimba Lake:—"An attempt to dam the outlet of the Ikimba Lake met with singular success during the year. An area of approximately two hundred square miles was inundated and the surface of the lake was raised nine feet. This provided a great convenience in obtaining domestic water supplies throughout the Ikimba depression. When water topped the dam and opened an unimpeded passage into the open water areas of the lake which are normally surrounded by miles of papyrus swamp and other vegetation, it allowed of the entry of fish which appear to have spawned in large numbers. Over two hundred fishing boats from all over the district have been operating on the lake for five months and regular supplies of fish are being sent to all parts of the district and to Uganda. Large numbers of people connected with the fishing industry have come to live along the shores of the lake and this settlement supplies proof of the theory that this area does hold undoubted possibilities as a means of easing our growing population densities within the chiefdoms lying along the Lake Victoria coast line. An investigation into the matter is proceeding."

In Musoma and North Mara it was more a year of recapitulation and marking time for bigger things when their respective development schemes begin.

(I) LAND UTILIZATION PLANNING

The series of *ad hoc* conferences adumbrated in the previous report were held in fact "on safari" on the sites of the problems and much useful groundwork was covered and principles laid down. The Provincial Commissioner acted as the chairman. A lot of information has been gathered together about *terra incognita* which will serve the Sukuma team in good stead. Good progress was made with the development map which is now almost complete after two years of work. It is not yet a complete development map on the lines of the Central Province, but gives the boundaries of 661 parishes or villages in the four Sukuma districts (though Maswa is still incomplete) and other relevant topographical details including the bush margin, position of fly, sites of water supplies, soils, etc. In addition, areas still unsurveyed by the Survey Department have been sketched in thus giving a more or less composite map for Sukumaland for the purpose of planning. A key to the names of the villages provides details for each village of densities of humans and stock, total population of both, area in square miles, topography of area and will shortly also include the soils. Development plans for the North and South Mara districts were considered in detail and approved. The former district is well ahead in getting a district team together, for it also has a Native Authority Development Officer on the establishment. Machinery is on order for soil moving and bush clearing.

(J) EXPANSION AREAS

Some consideration was given to possible areas for the expansion of the Bahangaza in Bugufi and what action, if any, should be taken in regard to the steady infiltration of population into Bushubi from Urundi. In the case of the former it was considered necessary first of all to get some idea of the conditions under which the people were at present living before deciding upon how to open up new areas. Factual information has been obtained from an acreage survey which is described in another section. In the case of the latter the topography of the country is such that there is little risk at the moment of over-crowding and their habit is to scatter rather than congregate.

In Majita, the grossly over-crowded peninsula in the Musoma district, the settlement scheme which has been hanging fire there for so long has at last become active. The native authorities themselves have managed, with the added attraction of tax exemption, to move out over two hundred taxpayers into the Suguti Valley, which has been the subject of clearing operations by the Tsetse Research Department and the Administration for a number of years. This is only the beginning of the movement of people—there are many more to go—and sanctions may still be required from Government to give it the necessary momentum, when it comes to the more obstinate being moved. In Sukumaland, many parts of which are still very fluid as regards population movement, voluntary penetration was still going on in Buchosa, which has been closed, and now extends to Bugando, an almost uninhabited chiefdom at the present time. As soon as the administrative establishment in Mwanza District is brought up to normal the Ukerewe Native Treasury should be asked to finance a settlement scheme for Ukerewe Mainland for which plans are already under preparation. Ukerewe Island, Karumo and Buchosa are now closed areas. There is quite a strong eastern movement in the direction of the Serengeti game reserve in the Maswa district, and small movements go on in the central Ntusu block of bush. Movement out is still taking place from the "Ibushi" areas of Shinyanga. Much of this movement has got to be canalized by the Sukumaland development team.

(K) DEVELOPMENT OF SUKUMALAND

The Malya development centre and federation headquarters has developed during the year, albeit slowly, owing to the lack of materials. Three houses for Europeans were completed. Workshops and machine shops were under construction. The Malya stock farm acquired a herd of Boran cattle and a rest house and cattle kraal were built there. Mr. Fairclough, the Co-ordinating Officer, arrived late in the year. Vehicles and tools are gradually being gathered together. Mr. Purvis who is the agricultural representative on the team arrived in July and took up residence at Lubaga Experimental Station until such time as his house in Malya should be completed. His assistance is much appreciated in supervising the station and helping from time to time in the district, particularly with matters distantly connected with development. In June a development officer was seconded by the Administration to supervise the work of rehabilitation in the eroded "ibushi" soil areas of Busha and Buduhe chiefdoms in the Shinyanga District. This is the first of the special areas to be dealt with by the development team, and as the sole representative at that time, Mr. Purvis took over this work. A very good rest camp was erected at Bubinza right in the middle of the area. As described elsewhere, one of the main jobs was to lay out grass strips on all the fields of "ibushi" soil. A large number of cattle were moved out of the area for the greater part of the dry season and grazing reserves were demarcated. Tie-ridging is to be practised on all the fields which have not been planted dry and are of the "ibushi" soil type. The population in this area has much decreased since the days when it was first considered a problem area and is still decreasing.

The Agricultural Officer, Sukumaland, was engaged during the year in studying the problems, and visiting the various areas in Sukumaland, making preliminary reconnaissance prior to assembling with the rest of the team mid-1948 at Malya. He supervised the work of the temporary District Foreman who was available for reconnaissance work in the latter half of the year, and also the two field officers who were posted to Maswa and Shinyanga respectively.

(L) TRAINING OF AFRICAN INSTRUCTORS

Mr. Hebenton (Education Officer) was seconded from the Education Department to take charge of the school in April. A lot of reorganization was necessary in view of the numerous changes in staff prior to his arrival. Moreover, the ever-present anticipation of the unfulfilled promise of new buildings has led to a policy of improvisation, which is not conducive to the best performance at a school. However, over

one hundred students were in residence and forty-one were passed out at the end of the year. The standard was moderately good. The general opinion of senior instructors in the districts, when asked their opinion of the ex-Ukiriguru students, is that they have profited by their course, do not have to be guided technically nearly so much, but are generally swollen-headed. They settle down however after a year. Not too much can be expected of a school teaching subjects which are not taught in the teachers' training schools to any extent, and whose teachers in a number of cases have still not done practical periods in the field as instructors. Starting with the new course in February, the school will have a total of one hundred and twenty students. A new temporary dormitory has been built to accommodate the extra twenty men. Better teaching methods have been introduced and all teachers submit their lesson notes in advance to the headmaster. As much practical work as possible is included in the syllabus, although the school has no farm of its own. The policy is as far as possible that of Mr. Squeers "How do you spell window"? and "go and clean it", but only one or two are cleaned, not a couple of dozen. Some idea of the attitude of the students can be gained by the following extracts from the Education Officer's report, though I think they give a rather exaggerated picture:— "There is a grave deficiency in recreational facilities due partly to inadequate accommodation and partly to the attitude of the students. . . . The school team withdrew from the Mwanza District Football League as the players were unwilling to make any contribution towards the cost of transport. . . . School sports were arranged but were cancelled owing to students refusing to pay entry money for prizes for the various events, in spite of the gratuitous offer of two silver cups." There has, however, been a great and badly needed improvement in the running of the school and by the time the new buildings are ready, the birth pains should have been experienced and overcome.

(M) PESTS AND DISEASES

The white- and yellow-headed stem-borers gained further ground in their steady advance into the arabica coffee areas. Growers will not take the trouble to protect their coffee by continually examining their trees and destroying the pest in the earlier stages of its life cycle and the pest continues to increase. The ultimate destruction of all arabica coffee is almost inevitable and it has been planned to replace this species by planting robusta coffee which enjoys practical immunity from the pest.

A serious infestation of the berry-borer beetle, *Stephanodores* occurred early in the year owing to neglect of measures advised for the control of this pest. A vigorous drive to collect all fallen cherry, saved this year's crop from considerable damage and loss.

Banana weevil has spread throughout the district and constitutes a very serious threat to this crop. Under normal weather conditions, and provided that adequate control measures are carried out, the effect of the pest does not appear to be alarming; but it is digging itself into the foundations of the banana industry and its ultimate effect on our staple food supply does not warrant any complacency. Rules to enforce control measures are under consideration.

An outbreak of brown streak in Irish potatoes was traced to unfavourable soil conditions resulting from flooding. This product continues free from blight.

Blackarm of cotton is making itself felt as a more potent factor in the reduction of cotton yields than was at first thought. The Ukiriguru workers are treating it as a major factor and are endeavouring to incorporate some resistance in their new strains. The other customary pests and diseases were with us, as always, but did not cause any undue alarm.

(N) DEMONSTRATION

District demonstration plots are intended to be obvious only for the fact that they are better managed than the rest of the peasants' fields around, and to be as little connected with the European as possible. In some cases this resulted, of course, in nothing being done in the way of better methods but, generally speaking they

were a success and this is a tribute to the instructors whose work it was to keep an eye on them. Beasts were awarded after harvest to the peasants who succeeded in their task. Some have been started up in North Mara as well as Ukerewe. There are about forty in Sukumaland, paid for out of development funds. They are laid out on a three-year rotational basis demonstrating all the important points in new farming methods and systems.

The grazing blocks at Nyamahona again demonstrated that one acre of pasture on the sandy soils is enough for one beast per annum, whilst up to one and a half acres is required on the "itogoro" hardpan. The chiefs of Sukumaland have voted funds for the presentation of a prize of one beast in each chiefdom to the best farmer, judged in terms of use of manure and adoption of tie-ridging.

(o) EXPERIMENTATION

As is usual a quotation from the progress report of the Empire Cotton Growing Corporation officer at present in charge of Ukiriguru and the Lubaga sub-station, will serve best to describe the work which has been undertaken during the year :—

"SUMMARY OF MAIN RESULTS

1. Crops were good on the whole in a year of very good rains ; but cotton suffered from jassid, blackarm, and in places water-logging.

2. Last year's provisional conclusion that at Ukiriguru, on light land, the benefits from a three years' grass rest had been dissipated in the year's cropping, has to be modified : a significant benefit has reappeared in the third year after apparently skipping the second.

3. The benefit from seven ton manurial applications was noticeable in the third and fourth years, on the light Ukiriguru soils.

4. N.P.K. trials the effect of nitrogen was large, of phosphate small and of potash negligible. The micro-plot technique promises to be useful.

5. Tie-ridging was still of value to yield even in a year of heavy rains.

6. Jassid damage was heavy in most areas and jassid-resistant strains showed to real advantage. Better jassid-resistance was doubtless the main reason for the superiority of the new strain mixture, UK. 46, over the commercial Mz. 561 which it is to replace ; UK. 46 out-yielded Mz. 561 by an average of 25 per cent in seventeen trials throughout the cotton belt.

7. Blackarm was widespread and the next issue of seed to follow UK. 46, another mixture, has blackarm resistance as a main aim. Shambat is helping with the work on blackarm.

8. A disease new to local cotton, *Ascochyta* blight, made a sudden appearance at Lubaga but did not spread."

Other interesting results which must still be regarded as a little tentative, until corroborated by another year's yield figures, are as follows :—

(a) An increase in yield of 30 per cent over continuous millet was recorded after three years under cassava.

(b) An increase in yield over continuous millet of about 50 per cent as a result of three years' rest under *Cenchrus*, and also under elephant grass, two years' rest under weed fallow, and after one year of velvet bean ploughed in as green manure.

(c) An increase in yield of tie-ridged cotton of 50 per cent over ridges made native fashion without tieing. A similar trial under a grain crop showed no gain this year.

The grass collections at both Ukiriguru and Lubaga yearly grow in size. Creeping perennial types other than *Cynodon* are being found and developed. A start has been made at Lubaga in examining methods planting up leys and their after-management. The micro-plot technique for estimation of the needs of the soil was used at Ukiriguru

for the first time and gave interesting results. Nitrogen was shown to be needed even on the "mbugas". The Agricultural Officer, Mwanza, continued with his district rice experimental plots, the results of which satisfied us that only good could come from issuing the two varieties "Kahogo" and "Kilombero 18". These plots will prove of great value once the botanist who, it is understood, will be posted to Ukiriguru once a house is available, has managed to produce a few more strains of rice for trial. There is a big field for improvement in this respect. The trials in the district continue.

(P) PROPAGANDA AND CONTACT WITH THE PEASANT

The importance of this contact is always before us, but the shortage of staff prevents us from achieving it in anything like the intensity required. The annual dry season indirect approach tour of the Agricultural Officer, Mwanza, could not be undertaken owing to his expected transfer in October. One Agricultural Officer, in Sukumaland on extension work and one African Agricultural Assistant give little scope for anything more than bare maintenance in at least two districts of the four. The African agricultural assistants are certainly keeping in very close touch with the peasantry, but even they find their reactions puzzling.

(Q) GRADING AND MARKETING

In Bukoba, 22 per cent of the coffee crop was rejected on the average every month. At times the figure reached 40 per cent. A very great improvement is already noticeable in the quality of the coffee now being received at the two coffee curing works since the zoning system started in November. It is hoped to bring in bulk-grading as soon as the layout of the factories allows of it; this will result in a great saving of time, so that the agricultural assistant can spend more time in the field.

The grading of tobacco in Biharamulo was again further simplified, to include cutter and filler grades only. The Tobacco Officer, Biharamulo, remarks:— "The tobacco was very good this year, much of it was real wrapper grades very suitable for the English markets and the growers did try to do as they were told, with the result that the curing and handling was nearly perfect. Very little over-moist tobacco was about in the markets and green was practically negligible being only six bales this year, as against 118 bales in 1946 from a much smaller tonnage."

Measures to popularize the Bugufi coffee crop are under consideration by the provision of mechanical separators, in addition to other facilities such as buying at a number of centres and payment on delivery. The coffee of Bukoba is worth about £350,000 per annum to the producer. The method of marketing has always been the subject of comment and surprise. It was quite time that it was reorganized. Competition for the crop led to indiscriminate buying of low quality coffee. The price paid bore no relation to the care given to the trees themselves or the treatment that the harvested product received. There was also a strong local demand by the producer to have some say in the marketing of his own product. To this end the Bukoba Native Coffee Board was instituted with power to purchase all the crop if it wished. It has entered into a five-year contract with the Ministry of Food for part of the crop, the rest to go on the open market. The Bukoba Native Coffee Board was appointed the sole buyer of all native-produced coffee in November. The district was zoned and prices fixed and a buying agent was appointed to each zone. It is hoped to eliminate competition in buying and to maintain a standard quality of purchases in the field. This will lead to better preparation before sale and will tend to enforce cultural measures and pest control. The scheme aims at establishing a coffee hullery in each zone, to treat dry coffee locally and then to send the semi-cleaned product to a finishing plant at the port of Bukoba. It is planned to use the hulleries as focal points for the first steps in co-operative marketing and ultimately to merge all the zonal organizations into a single co-operative unit. Late in 1947 approval was given for the formation of a board—as yet nameless—to deal with existing tobacco in the Biharamulo and Ngara districts and the anticipated crop

from North Kibondo. The alternative was a co-operative in name but not in function and it was considered better to give chosen African members of the board a chance to get experience rather than to thrust upon them an organization of which the spirit could not—at this juncture—possibly be co-operative. The zoning of cotton producing areas to ginneries was a success and marketing proceeded smoothly. Africans in the Nassa and Ukerewe areas in Mwanza District decided it was time to provide facilities for producers to have their loads of cotton weighed by their fellows. Marketing of the crop was much delayed as a result and in many cases independent weighers were equally blameworthy. It is difficult to say whether it was a success or not for the producer. The independent weighers however got their fees. It may have had a salutary effect on the recognized buyers, reminding them that they were not the only fish in the sea. Standardized tare containers for cotton were provided in one of the markets, but were not very popular.

(s) IMPLEMENTS

As soon as the Plough Rules are approved for Sukumaland, a plough inspector will be appointed to each district whose duty it will be to keep records, see that revenue is collected and licences issued, and advise and teach the African to use and look after his plough, not forgetting that every plough owner must know and follow the rules. Lists of plough owners have been collected for each district. There are five thousand in North Mara, equivalent to one man in five of the population.

The introduction of carts and wheelbarrows is a necessary preliminary to the use of farmyard manure in North Mara and would speed-up its general adoption in Sukuma. How to get them is one difficulty and how to popularize them is another. There are plans for the use of mechanical units to plough up "mbuga" lands in Sukumaland. From this initial effort much experience will be gained as to how we can best help to reduce the pressure of cultivation on the light lands by this means and give the cultivators more time to attend to improved agricultural methods which will inevitably improve the general efficiency of his agriculture, which although not inconsiderable in total, is at a very low level still in terms of production per individual. The mbugas are the reserves of fertility in the overcrowded areas of Sukumaland. Those who do not wish to go to new areas will have to make the best of what remains to them in their home lands.

(t) CROP SURVEYS

The acreage of crop surveys of 1945 provided fundamental information for planning land utilization in Sukumaland. Equally important information was required in Bugufi of acreage needed per household in order to plan methods for settlement when the thinning out of population is tackled. Other useful information to be obtained from the three per cent survey is the type of land tenure practised and the effect of the different types of tenure on the acreage cultivated. Preliminary calculations indicate that the average acreage of crops is 2·57 per householder or one acre per adult, of which bananas amount to 0·66 acre and 0·26 acre respectively. This compares with 1·62 per adult in Sukuma. The next important work in this connection is a yield survey of Sukumaland which is planned for 1949.

MISCELLANEOUS

A small book entitled "The Agriculture of the Cultivation Steppe of the Lake, Western and Central provinces" was submitted in manuscript in October 1946 together with photographs. Funds have not yet been found for its publication. Other members of the department were contributors as well as the writer of this report who also edited it. Of greater importance, really, is the version in Kiswahili, also submitted, which was translated into the vernacular by Mr. Abdullah Fundikira, African Agricultural Assistant. In view of the importance attached to original publications in the vernacular and to the development of agriculture, it is a pity that there has been delay in publication. An article on the development of Sukumaland was also circulated and published in the *East African Annual*.

The Senior Agricultural Officer is a member of the Lake Victoria Fisheries Board under the High Commission and attended an inaugural meeting at Jinja in December. The Chief Fisheries Officer is to be housed at Mwanza in the first place with a fisheries officer, but the former will later move to the north of the lake.

The Senior Agricultural Officer's office is now equipped with a calculating machine, an adding machine, a planimeter and a pantograph. Some new office furniture has been obtained including a mapping table with shelves for maps. Permanent file covers of solid material have been provided for all permanent records and district books which are lodged in the Senior Agricultural Officer's office out of harm's way. A temporary office for the Agricultural Officer, Mwanza, was erected by the Senior Agricultural Officer with assistance by the Public Works Department, as the surveyor required his office back again. Also an extension in the form of a clerk's office was added on to the verandah of the Senior Agricultural Officer's office.

CONCLUSION

Owing to the good season less anxiety was felt over the quantity of food and cash crops produced than the manner in which these crops were produced. Attempts were made in most districts, in one way or another, to improve cultural practices, in some cases by propaganda alone and in others by means of sanctions under the Native Authority Ordinance. They met, by and large, with singularly little success. To no small extent is this due to the absence of European staff, without a larger number of whom it is quite obvious little advance can be expected. As the peasantry begin to think for themselves a bit more, so admittedly can propaganda have greater effect, and force correspondingly less effect, unless properly explained in the first place, but there must be properly organized campaigns and personalities behind them and the knowledge that Government means business if the cultivators do not do what they are advised—after a trial period—by choice. It is senseless for Government to pay lip-service to propaganda measures when there is not even any staff to undertake it. We have got no farther in establishing a farming system which includes a grass rest, except that there is at least a means of introducing the first stage in the grass strips of Shinyanga and Maswa.

Thought has been given to means of using the rich mbugas more effectively, and to ways and means of adapting mechanical cultivation units to be used by tribal or village groups.

There is no need to recapitulate the conclusions of the report of last year. Suffice it to say that every word still remains true, that those are still our aims. The year, though in a sense one of marking time both for extension and development staff, has not been wasted. Big strides have been made towards getting the team idea entrenched, to thinking of the four Sukuma districts as one with one problem, to acting in concord and to joint consultation. A vast amount of factual information has been collected and recorded and, in the case of Sukumaland, preparatory work has been done which has put the team a good step ahead of where it would have been had individuals started independently.

There is less need than in the past to make acknowledgments for assistance given, when one is working in a team. In view of the co-ordination in teams which is developing, acknowledgments for assistance given during the year, may smack of mutual admiration, but there is no doubt that there has been willing assistance given on all sides, for which thanks are due, particularly to the Administration in those districts where there have been no departmental representatives. Mr. Tregarthen, District Foreman in the Kwimba District, has given of his customary sterling service to our cause. Officers of the Empire Cotton Growing Corporation have as usual been most co-operative and thanks are due to them.

N. V. Rounce,
Senior Agricultural Officer,
Lake Province.

PRODUCE STATISTICS 1947

Tons of 2,000lb. Value in £s.

District	Cotton		Groundnuts		Simsim		Chick pea		Paddy		Grains		Cowpea		Gum	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Kwimba ...	4,376	68,493	1,247	18,342	8	118	572	10,568	1,960	17,321	222	1,439	310	3,003	97	2,017
Musoma ...	2,483	37,396	172	2,592	57	865	–	–	472	3,883	179	1,102	–	–	–	–
North Mara	–	–	0·75	10	28	397	–	–	–	–	2,308	12,697	–	–	–	–
Maswa ...	3,925	58,491	700	10,500	–	–	–	–	–	–	–	–	–	–	–	–
Shinyanga ...	1,218	18,070	1,072	16,080	–	–	163	2,448	837	6,896	380	2,410	126	980	176	4,752
Mwanza ...	9,797	153,621	460	6,900	18	242	1,323	26,400	5,400	46,811	1,615	12,100	1,615	13,000	–	–
Bukoba ...	–	–	–	–	–	–	–	–	–	–	1,414	3,300	–	–	–	–
Totals ...	21,799	336,071	3,651·75	54,424	111	1,622	2,058	39,416	8,669	74,911	6,118	33,048	2,051	16,983	273	6,769

District	Beans		Coffee (Arabica)		Coffee (Robusta)		Soya Beans		Onions		Potatoes		Citrus		Cassava	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Kwimba ...	0·38	3	–	–	–	–	–	–	–	–	–	–	–	–	2	–
Musoma ...	30	289	–	–	–	–	–	–	–	–	–	–	–	–	–	–
North Mara	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Maswa ...	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Shinyanga ...	127	889	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Mwanza ...	–	–	–	–	–	–	–	–	–	–	–	–	–	–	560	–
Bukoba ...	411	3,699	2,953	138,736	6,510	266,978	213	–	98	–	228	–	220	–	13	–
Totals ...	568·38	4,880	2,953	138,736	6,510	266,978	213	–	98	–	228	–	220	–	573	–

MONTHLY VALUE—BUKOBA COFFEE EXPORTS (In £s.)

Annexure 2 (Lake Province Report)

Month	1941		1942		1943		1944		1945		1946		1947	
	Arabica	Robusta	Arabica	Robusta	Arabica	Robusta	Arabica	Robusta	Arabica	Robusta	Arabica	Robusta	Arabica	Robusta
January ...	1,512	3,572	5,420	8,044	4,013	15,541	5,368	8,392	11,077	15,040	3,007	8,767	2,865	13,293
February ...	3,208	4,554	3,156	6,944	613	5,601	1,706	4,110	7,810	9,266	3,085	8,511	9,036	30,872
March	4,756	3,251	1,671	4,722	606	3,133	1,266	1,811	2,925	6,945	2,276	4,472	11,470	25,485
April	3,329	1,882	3,156	2,170	2,852	1,368	2,079	1,362	5,694	1,900	4,474	3,677	4,534	17,256
May	5,247	7,436	13,098	4,325	5,882	2,103	8,360	1,700	9,750	2,165	6,821	2,593	9,480	1,783
June	14,048	16,389	29,781	22,731	13,342	7,221	37,511	5,289	17,395	8,858	11,615	6,753	14,637	1,773
July	19,492	30,301	16,429	34,221	12,223	33,712	43,167	24,178	20,137	43,299	9,601	26,954	26,802	46,956
August	13,141	45,832	14,209	40,532	9,407	34,917	30,956	53,795	7,007	61,636	4,444	30,604	22,764	48,248
September ...	7,391	15,310	6,325	32,075	5,270	22,213	20,023	46,845	3,578	39,814	2,458	18,362	13,740	37,716
October ...	4,722	5,897	12,000	19,800	6,678	17,368	5,280	11,711	5,731	32,799	3,211	11,112	11,675	23,052
November ...	2,930	3,071	8,441	11,041	6,112	9,894	13,164	33,774	6,346	23,060	1,966	14,337	3,950	15,542
December ...	3,036	3,610	7,538	8,227	1,613	5,207	7,333	18,486	3,592	10,708	4,590	9,499	7,783	5,002
Total ...	82,812	141,105	121,224	194,832	68,611	158,278	172,213	211,453	101,042	255,490	57,548	145,641	138,736	266,978

TABLE OF COFFEE EXPORTS FROM BUKOBA (IN TONS)

Annexure 3 (Lake Province Report)

Months	ARABICA							ROBUSTA						
	1941	1942	1943	1944	1945	1946	1947	1941	1942	1943	1944	1945	1946	1947
January ...	44·73	143·70	75·00	125·00	240·48	65·00	56·53	158·76	247·50	385·00	225·00	355·71	204·43	285·00
February ...	91·31	84·15	15·00	40·00	165·33	65·00	170·00	202·44	215·46	155·00	110·00	218·37	200·00	645·00
March	131·50	44·55	15·00	30·00	60·12	50·00	220·98	142·13	147·60	90·00	50·00	163·33	105·00	538·90
April	94·05	84·15	70·00	47·29	120·24	100·00	90·00	84·87	70·61	40·00	36·57	50·10	85·00	370·00
May	148·50	297·00	145·00	190·00	200·40	145·00	182·00	333·39	108·13	60·00	45·00	50·10	60·00	40·00
June	397·25	675·30	320·00	855·00	360·72	232·00	275·00	716·80	554·41	200·00	140·00	204·41	155·00	225·00
July	544·67	479·82	300·00	985·02	415·83	195·00	509·95	1,111·69	1,080·23	930·00	640·00	1,002·00	610·00	988·89
August	348·82	330·33	230·00	705·00	152·54	90·00	421·00	787·05	1,067·68	965·00	1,425·00	1,427·85	705·00	1,010·00
September ...	196·95	145·00	130·00	460·02	75·15	50·00	260·00	492·57	800·00	615·00	1,240·00	926·77	420·00	788·00
October ...	120·92	250·00	165·00	120·00	119·21	80·00	225·00	181·46	455·00	485·00	310·00	764·89	266·02	489·93
November ...	78·14	171·99	150·00	270·54	140·00	40·00	76·64	94·48	278·87	275·00	781·56	545·00	333·00	330·83
December ...	80·97	140·00	40·00	160·00	85·00	95·00	150·00	113·35	200·00	145·00	431·00	260·00	220·00	101·97
Total ...	2,277·81	2,845·99	1,655·00	3,987·87	2,135·02	1,207·00	2,637·10	4,418·98	5,225·49	4,345·00	5,434·28	5,970·53	3,363·45	5,813·52

Annexure 4 (Lake Province Report)

RETURN OF COFFEE INSPECTED AND GRADED AT BUKOBA DURING THE YEAR 1947.

Month	GRADED						Total Passed for Export		Rejected		Total Inspected		Priority		Revenue collected
	G. P.	A.Q. N.	F. P.	A.Q. N.	U. P.	G. N.	P.	N.	P.	N.	P.	N.	P.	N.	
															Shs. Cts.
January	26	–	573	4,789	308	450	907	5,239	420	3,308	1,327	8,547	–	–	1,974 80
February ...	–	–	2,662	11,100	174	135	2,836	11,235	711	2,376	3,547	13,611	54	24	3,451 10
March	–	–	3,516	9,039	643	553	4,159	9,592	2,065	1,815	6,224	11,407	–	282	3,603 70
April	–	–	1,048	5,110	172	585	1,220	5,695	557	1,108	1,777	6,803	–	–	1,716 00
May	34	–	2,628	567	389	164	3,051	731	645	136	3,696	867	–	–	912 60
June	67	–	5,175	3,631	219	8	5,164	3,639	2,768	1,022	8,229	4,661	67	6	2,602 95
July	–	66	7,048	16,775	934	943	7,982	17,784	1,412	2,830	9,394	20,614	18	290	6,078 60
August	226	–	6,185	16,080	530	538	6,941	16,618	1,360	3,436	8,301	20,054	70	31	5,710 35
September ...	–	71	4,494	12,485	360	483	4,854	13,039	1,285	3,224	6,139	16,263	–	36	4,496 60
October	–	120	2,893	7,579	481	281	3,374	7,980	1,154	1,908	4,528	9,888	–	86	2,904 70
November ...	–	–	1,472	5,053	225	415	1,697	5,468	841	1,800	2,538	7,268	–	–	1,961 20
December ...	–	60	2,096	2,346	406	80	2,502	2,486	674	451	3,176	2,937	–	48	1,239 40
Total ...	353	317	39,790	94,554	4,841	4,635	44,984	99,506	13,892	23,414	58,876	122,920	209	803	36,652 00

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Western Province

STAFF

There were a number of changes in the Tabora District during the year owing to the Agricultural Officer being on vacation leave. The Crop Supervisor, Kigoma, resigned and was replaced by a field officer.

The European staff position was as follows:—

Western Province. Mr. A. Pitcairn, Senior Agricultural Officer.

Tabora District. Mr. M. Lunan, Agricultural Officer, proceeded on vacation leave 30th April 1947.

Mr. D. Morrison, relief for Mr. Lunan, was transferred to Masasi on 15th April 1947.

Mr. K. Johansen, Agricultural Assistant, transferred from Masasi on 27th April 1947, was stationed at Tabora until 24th September. Mr. Johansen was granted a four years' scholarship at Edinburgh University.

Nzega District. Mr. V. Allen, Agricultural Assistant proceeded on vacation leave on 8th June 1947, and no relief was provided.

Kasulu District. Mr. R. Seager, Agricultural Assistant.

Kigoma District. Mr. R. J. Mulcahy, Agricultural Assistant, Kigoma, resigned on 17th April 1947, and Mr. P. F. Ellis, Field Officer took over at Kigoma on 7th May 1947.

Kahama District. Mr. H. J. P. Nelson, Field Assistant.

The African staff of the Provincial Agricultural office consisted of two African clerks, Grade III and one messenger.

The African field staff consisted of four overseers, twenty-four African instructors (ungraded), eighty food production instructors and two beeswax instructors. The numbers employed in the various districts of the province were as follows:—

District	Overseers	African Instructors Ungraded	Food Production Instructors	Beeswax Instructors
Tabora	2	7	18	1
Nzega	2	5	10	–
Kahama	–	3	7	1
Kigoma	–	3	10	–
Kasulu	–	2	15	–
Kibondo	–	2	10	–
Ufipa	–	1	5	–
Mpanda	–	1	5	–
	4	24	80	2

Some ten instructors employed by the native authorities in Tabora, Kigoma and Kahama districts worked on soil conservation and increased production propaganda.

GENERAL REVIEW OF THE YEAR

Rain was adequate and well distributed throughout the season in all districts. In some parts of Kasulu District and Tanganyika Lake areas the rain was rather excessive. The total rainfall for the season November 1946 to April 1947 at Tabora was 41·94 inches as compared with 34·20 inches the previous season. The total for the year 1947 was 38·50 inches. The average for Tabora over a number of years is 34·32 inches. The quantity and distribution of the rains was very favourable to agriculture except in areas where serious flooding took place due to excess of rain.

Production for the year was very good and the quantities of surplus produce sold at the produce markets was over three times that of the previous year. Groundnuts, paddy, sorghum and various legumes accounted for the main increases. Sales of cassava were much lower due to the abundance of other crops.

Food supplies were plentiful in all districts and substantial exportable surpluses of the more important crops were marketed. The province was self-supporting in most products required for fed labour during the year. Mixed beans, were, however at times, in short supply.

The demand for agricultural tools, implements and equipment is increasing, and except for hand hoes, the progressive Africans find great difficulty in getting what they really want. The greatest demand is from Nzega District and an arrangement made with the Provincial Administration to place orders and pay accounts through a Native Treasury Advance account helped considerably.

A summary of the agricultural situation in each district is as follows:—

Tabora District.—Every important part of the district was visited at least once during the year by an agricultural officer. The increased food drive was continued with considerable energy and success, this combined with a favourable season which brought the yield of all crops above average, resulted in the marketing of appreciable surpluses of food crops for disposal outside the province. Very good progress was made in the building of dams for rice growing. Agricultural Assistant K. Johansen supervised this scheme with enthusiasm and eight dams were completed in the Tabora area during the year.

Nzega District.—Some 35 per cent of the 15,000 tons approximately of surplus produce marketed in the Western Province was the produce of Nzega District. Groundnuts and paddy were the main products. Nzega is the most progressive district in the province and good progress is made through co-operation with the chiefs in all agricultural matters. A very successful Native Authority agricultural show was held at Mwanhala on the 15th July, 1947, this being the forerunner of similar types of shows to be held in the future. A proposal to establish a stock farm financed by the Nyamwezi Federation creameries has been approved and a site selected adjacent to the Mwanhala Agricultural Station.

Kahama District.—This district which formerly formed part of an Administrative division combined with Nzega was gazetted as a separate district in 1947. Following this move there has been greater interest in agricultural development and in the eastern Kahama chiefdoms where the population is concentrated there is a strong desire to participate in the various agricultural development schemes now in progress. A start was made on dam building and the Native Authorities have voted funds for the establishment of an Agricultural Development Centre where oxen can be trained for draught, ploughing taught and agricultural implements stocked for sale.

Kigoma District.—This district has been reduced in area since the formation of Mpanda District and the important paddy producing areas on Tanganyika Lake shore from Karema to Lagosa are no longer controlled administratively from Kigoma. Commercially, however, Kigoma has retained its importance owing to its situation at railhead and being the most important Lake port. The Field Officer, Kigoma, was in charge of agricultural duties Kigoma and Mpanda districts during the year. Unfortunately the situation in the Luitchi Ruanda so far as area cultivated is concerned has become worse instead of better owing to a breach in the river bank near Luitchi station. This breach was repaired but 800 acres were lost to cultivation through flooding. Apart from this unfortunate loss in area this year the situation in the Luitchi swamp is not likely to improve until the sytematic clearing of the Luitchi and the desilting of the Luitchi mouth is again undertaken as an annual routine practice. The interest taken in the palm oil industry has been fully justified. The export trade in palm kernels is now re-established and palm oil production for export is on the increase.

Mpanda District.—This new district created in 1947 is based on the Mpanda mine area and takes over the Buholoholo area of Kigoma District, the Nyonga and Uruwira chiefdoms of Tabora District and the Rungwe and Mpimbwe chiefdoms of Ufipa District. Special attention has been given to the production of food supplies for the Mpanda mine labour.

Ufipa District.—The reduction in size of this district by the ceding of two chiefdoms to the new Mpanda District in no way lessens the importance of Ufipa from an agricultural point of view. During the year the possibilities of the Ufipa Plateau for European Settlement has been reconsidered and plans have been prepared for establishing a Native Authority agricultural sub-station at Sumbawanga. This District also meets demands for food supplies for labour employed by the red locust control and the Mpanda Mine. Other important outlets for Ufipa produce are to Northern Rhodesia and by lake steamer to Kigoma.

Buha District consists of the Kasulu and Kibondo divisions The haricot bean scheme continued again in 1947 and 75·4 tons of haricot beans were purchased and resold to meet demands for fed labour in the province. Although the Kasulu District is potentially a productive area comparatively small quantities of mixed beans and grains are marketed in this area for export through the central railway. There is little indication that the situation is likely to change in the very near future but it is believed that quantities of produce are taken across the border to Urundi for sale.

A start has been made to grow tobacco in the Kibondo division as an extension of the Biharamulo native fire cured tobacco industry.

CROPS IN DETAIL

Grains

Sorghums and Millets.—There has been an increase in production of sorghums and to a lesser extent bulrush millet although the latter is an unpopular crop, especially in Tabora District. This prejudice is being partially overcome by increased prices and distribution of awned millet seed to reduce loss by birds. The quantity of sorghums and millets sold at the produce markets in 1947 was 1,632 tons as compcompared with 160 tons in 1946. Most of the sorghums and millets are produced in Unyamwezi but sorghums are grown fairly extensively in Buha District from where over 100 tons were marketed in 1947.

Eleusine.—Surpluses of 196·5 tons were sold in Ufipa District in 1947 to Red Locust Control and Northern Rhodesia.

Maize.—There was an increase in the exportable surplus as a result of the higher prices and favourable season. The demand for maize for fed labour in the province is rapidly increasing and increased production of this crop on a large scale should come from the potential undeveloped areas in Kigoma and Mpanda districts. Buha District could also supply greater quantities of maize.

Rice.—Production of paddy in 1947 was very good especially in Unyamwezi as there was no long break in the rains. At Kigoma and some of the paddy producing areas on Lake Tanganyika there was considerable loss of crop by flood damage. 3,933 tons of paddy were marketed during the year, 2,416 tons of which were from Nzega District. A much bigger production could be obtained by greater use of suitable land, better cultivation methods and increased use of dams to provide irrigation water. The Mpanda District lake ports (formerly Kigoma District) production was well up to the estimate and 839 tons were marketed. The Ufipa paddy crop on the other hand was dropped from over 500 tons a few years ago to 23 tons in 1947. This is mainly due to lack of organized paddy markets and it is proposed to introduce paddy markets next season.

Root Crops

Cassava.—The quantity of cassava marketed this year was about half of the previous year consequently there is a big reserve of cassava in the province. During the planting season propaganda was carried out to ensure that areas of cassava dug up for food or sale are replaced in order to maintain the provincial reserve. This reserve is well established in Unyamwezi and quantities of cuttings have been issued from Kigoma to build up a similar reserve in the parts of Kigoma and Mpanda districts which are liable to suffer from food shortages in bad seasons.

Seven railway trucks of cassava cuttings were sent from Igalula to Manyoni, Central Province.

Ten cuttings each of thirteen different mosaic resistant cassava varieties were received from the Agricultural Research Institute, Amani, for trial at Tumbi.

Legumes

Beans (Mixed).—Good crops were harvested in all districts and 512 tons were marketed at the produce markets which is a higher surplus than usual. The quantity marketed in 1946 was 156 tons. Most of the bean crop is absorbed in the local markets.

Beans (Haricot).—75·4 tons were marketed compared with 31 tons in 1946 and 17·5 tons in 1945. Towards the end of 1947 it was agreed to market the crop through an approved buying agent. This will replace the present system of purchasing direct from the grower by the Agricultural Assistant. The issue of seed for the 1947/48 main crop planting season has been restricted to the Makere area. The Buhinga and Bugaga areas which did not receive an issue of seed in 1947 marketed appreciable quantities during the year.

The following were the quantities handled during the year:—

	Kilos	Kilos
Balance on hand 31st December 1946		12,314
Purchases and return of seed 1947		77,510
		89,824
Less sales of haricot beans	75,450	
Issue of seed	10,200	
Loss in handling, weevil, damage, etc ...	4,174	89,824

Balance in hand 31st December 1947—Nil.

Other Legumes.—Cowpeas and pigeon peas did well in 1947 and the quantities marketed were 888 tons cowpeas and 91 tons pigeon pea. The cowpeas were mostly from Kahama District and the pigeon pea from Kigoma and Buha.

Oil Seeds

Groundnuts.—The groundnut crop was very good in all districts.

In Unyamwezi 3,785 tons were marketed in the province during the year. Rosette disease was not prevalent. The groundnut scheme has started to develop an area at Urambo.

Palm Oil.—The start made last year at Kigoma to revive the marketing of palm kernels has met with considerable success. The quantity marketed has risen from 17 tons in 1946 to 207 tons in 1947. The quantity of pericarp oil marketed for the year was 34·4 tons. Efforts were made to introduce presses suitable for use by small scale producers and an order has been placed for a demonstration press but because of supply difficulties the manufacturers have not been able to arrange delivery this year. A supply of pedigree seed received from the Congo was planted at a Government nursery near Simbo, Kigoma District, and a fair percentage of the seeds have germinated. A small supply of the Congo seeds planted at the Tumbi Agricultural Station nursery has germinated fairly well.

Sunflower.—The government issue of seed was readily taken up and the response to plant this crop is satisfactory. Ten and a half tons of seed were distributed.

Onions, Vegetable and Fruits.—624 lb. of onion seed received for resale to onion growers has been readily taken up, a small reserve of seed being held for sale in 1948. The quantity of onions moved by rail during the year was 18·6 tons. A supply of miscellaneous vegetable seeds purchased from Nairobi was resold to African vegetable growers. Nurseries have been established at the Tumbi and Mwanhala agricultural stations and a start made to raise fruit and other trees for distribution in the chiefdoms.

Beeswax and Honey.—1947 was a poor year for beeswax and honey. The quantity moved by rail was 190·6 tons beeswax and 33·9 tons honey as compared with 222 tons beeswax and 109 tons honey in the previous year. The improvement of beehives and extension of their use is under consideration in consultation with the Government Entomologist. An improved type of two chamber hive is being tried out in a production test against local hives. One hundred hives were placed in a selected "miombo" area near Kitunda for the October swarmings and 24 hives at the Tumbi Agricultural Station.

Gum.—The quantity of gum marketed at the Nzega gum markets was only 244·5 tons as compared with 320 tons the previous year. This reduction is due to the lack of interest in gum collection during a year of abundance of all crops.

Efforts were again made to stimulate interest in gum marketing at Rungwe chiefdom, Mpanda District, but little interest was taken and only 257 kilos were sold.

Wheat.—Exports of wheat from Ufipa to Northern Rhodesia were 21·2 tons and to Kigoma 10·1 tons as compared with a total of 37 tons in 1946 and 24·5 tons in 1945.

Tobacco.—Six Africans were sent from Kibondo to Biharamulo for training by the Tobacco Officer. Seed beds have been laid down.

Potatoes.—27·3 tons of potatoes were marketed in Ufipa District of which 26·6 tons were exported to Northern Rhodesia.

AGRICULTURAL PESTS AND DISEASES

Locusts.—The occurrence of red locust hopper bands at widespread points in the vast swamps near the Tabora, Kigoma, Kasulu and Kahama districts boundaries was the cause of some concern. Mr. F. B. Notley, Entomologist, took over all locust duties in the Western Province on the 30th July, 1947.

Stalk Borer.—Early and late planted maize and sorghums suffered severe damage from stalk borer and the annual average loss of crop is estimated at over 25 per cent in Unyamwezi.

Elegant Grasshoppers severely damaged cassava in the latter part of the dry season.

Striga.—This pest is not very severe in Unyamwezi but might easily become so if allowed to spread. The campaign against striga in Tabora District was carried out with energy and some success.

Mosaic of Cassava.—Continual propaganda is carried out to stress the value of planting disease-free cuttings. This has had some effect on the reduction of this disease.

Smut of sorghums has been fairly widespread.

Game.—Considerable damage is done to crops by pig and baboon. It was observed during tours that some isolated settlements near bush areas take special measures to combat this evil. Two creditable instances noted were one at Kalya on Lake Tanganyika where several miles of pig trench was dug surrounding the

whole village and the other at Kiwere an isolated Tabora chiefdom on the Itigi road where the village cultivated lands were completely surrounded by a pig proof fence.

MARKETING

The quantities of all crops marketed were well above average. Supplies were plentiful everywhere and even greater quantities might have been marketed but for delays at some of the markets due to insufficiency of bags, shortage of cash held by traders to cope with the big crops and slowness of movement of produce from railhead. There is no record of the quantities marketed at authorized trading centres but the figures from the produce marketed at native authority produce markets act as a guide showing the value of the produce sold.

The records of quantities of each product marketed and its approximate value during 1947 is :—

Product	Quantity marketed in 1947 Tons	Approximate value £
Bambarra groundnuts	404·1	4,646
Beans (mixed)	512·4	5,120
Cassava	1,034·8	6,204
Gram (choroko)	9·7	90
Groundnuts	3,785·6	37,850
Maize	2,203·3	12,106
Millet	88·7	660
Peas (dengu)	4·9	80
Peas (kunde)	888·5	8,880
Peas (mbaazi)	91·4	900
Paddy	3,933·6	39,330
Rice (hand-hulled)	50·5	50
Sesame	4·4	40
Sorghum	1,543·6	11,587
Beans (haricot)	75·4	937
Onions	18·6	54
Wheat	31·4	200
Palm oil	34·4	2,443
Palm kernels	207·2	2,726
Beeswax	190·6	47,000
Honey	33·9	2,500
Gum	244·5	9,760
Potatoes	26·6	60
	15,418·1	193,223

The tonnage of the principal agricultural products moved by rail during the year is as follows :—

Product	Tabora, Kahama and Nzega Stations Tons	*Kigoma Station Tons	Provincial Total Tons
Beeswax	109·7	81·0	190·7
Honey	27·9	6·0	33·9
Maize and flour	1,092·7	346·4	1,533·9
Cassava and flour	514·2	451·1	968·3
Beans and peas	987·3	127·4	1,114·7
Mtama and millet	603·9	91·5	695·4
Rice	714·4	392·0	1,106·4
Gum	131·4	–	131·4
Vegetable oil	53·7	–	53·7
Groundnuts	2,205·3	22·0	2,227·4
Sesame	14·7	5·0	19·6
Oil cakes	283·7	–	283·7
Onions	18·6	–	18·6
Bambara nuts	212·5	–	212·5
Sisal	664·1	–	664·1
Palm kernels	–	212·5	212·5

*Excluding Congo produce in transit from Kigoma.

Estate Agriculture.—The Malongwe sisal estate continued in full operation during the year. The production was 965 tons and 664 tons of sisal were moved by rail as compared with 1,053 tons in 1946, 913 tons in 1945 and 715 tons in 1944. The machinery at the Laxmi sisal estate at Kigoma is being overhauled and this estate should be producing next year.

AGRICULTURAL STATIONS

Tumbi Agricultural Development Centre.—The following is a summary of the work at the Tumbi station during the year.

Rains were adequate and well distributed during the year. 41·38 inches fell during the growing season November 1946 to April 1947 and 39·11 during the year. The season was a good one for crops and the farm fulfilled its purpose as a provider of good seed and planting material for the district.

The total acreage under crop was 58·15 acres and nine tons approximately of seed were sold and 10,000 cassava cuttings distributed.

Development work has gone ahead well during the year and the following progress made:—

(1) The first paddock has now been cleared and bounded by a *Euphorbia* hedge.

(2) Two staff houses have been completed and the foundations of two more laid. The implement and tool shed is complete and a new roof put on the seed store.

(3) A second dam has been built to supply water to the lower end of the rice mbuga and a third about half a mile eastward from this. These will improve rice cultivation in a big area stretching from the farm garden about half a mile eastward along the Usoke road.

(4) 2·2 more acres of rice land were prepared and planted and three acres cleared and levelled for 1948 planting.

(5) Felling trees and uprooting stumps in the clearing continued.

Parties of chiefs and headmen, Tabora school boys and instructors were at various times shown round the farm. A start has been made in developing a nursery of fruit and flowering trees and plots have been laid out and planted with local perennial grasses.

Mwanhala Agricultural Development Centre.—The rainfall for the season at Mwanhala was 41·74 inches and the harvest was the best for a number of years. The Agricultural Assistant was on vacation leave from June to December and the African overseer was left in charge under the supervision of the Agricultural Officers at Tabora who made frequent visits to the station.

The total acreage planted was 96 acres. The following quantities of selected seed were available for disposal:— Paddy 9 tons, maize 4 tons, groundnuts 4 tons, bambarra nuts 1 ton, bulrush millet 1¾tons, sorghum ¾ ton and cowpeas ½ ton.

There was a good demand for seed but because of the excellent crops at the farm and in the district this year fair quantities of surplus seed left over was sold to other districts.

Development work carried out at Mwanhala during the year was: Main roads resurfaced and contour drained; new implement shed built; two quarters for Africans built; forty acres grazing paddocks completed.

An agricultural show held at Mwanhala in July was well attended and opportunity was taken to show the visitors the work in progress

As a result of the vigorous measures taken during the past two years in dealing with the tsetse fly position no losses of livestock occurred and the improved conditions of the cattle with a substantial increase in healthy calves is significant.

Mwanhala acted as a supply centre for resale of agricultural tools and implements and this service is rapidly on the increase. Ploughs, plough spares, yokes, chains, wheelbarrows, picks and shovels and various small hand tools were purchased through native authority funds for resale.

EXPERIMENTS AND CROP TRIALS

A detailed report on the experiments is submitted separately but the following is a summary of the work.

Tumbi Agricultural Development Centre.—Preliminary trials with sulphate of ammonia and silicophosphate alone and in combination showed substantial increases in yield resulting from applications of silicophosphate and silicophosphate plus sulphate of ammonia. The analysis of the results is not yet complete.

Mwanhala Agricultural Development Centre.—Experiment M 1 : Fallow, maize after fallow. This experiment is in the final fallow year.

Experiment M 2 : Manurial compost versus rock phosphate started in 1945 continued in residual but no significant results were given by rock phosphate.

Experiment M 3 : Ridge cultivation. No significant results possibly due to the exhausted fertility of the soil. It is proposed to repeat this experiment on the same land after an overall treatment of six tons manure per acre.

Experiment M 4 : Silicophosphate experiment. Early observations same as for Tumbi. The final results are not yet worked out.

Demonstration Plots.—The Agricultural Officer reports that the demonstration plots of good and bad farmers' fields showed very definitely the benefits of manuring, tie-ridging and early weeding on a crop of maize and bulrush millet. In some plots the bulrush millet was entirely destroyed by birds.

SOIL AND WATER CONSERVATION

Soil Erosion.—Anti-erosion measures continue to be taught by the instructors. Good progress was made in the scheduled areas of Nzega and Kahama districts but the scheduled area in Tabora District showed little better progress than elsewhere. At Kazima school farm erosion has been greatly retarded by the use of contour banks and contour ridges.

At the Tumbi Agricultural Station tie-ridging, contour ridging, and contour strips are now standard practice on the farm and there is very little erosion going on.

Water Conservation.—The scheme of construction of dams for rice growing has made very good progress during the year.

The work in the province was eight dams completed in the Tabora District, two completed in the Nzega District and supervision given to the building of two dams for the chief of Ibiri.

The dams were made by hand labour with help from oxen and dam scoops when working in tsetse-free areas. The mechanical equipment, apart from a Fordson Major land utility tractor, has not yet arrived. The approximate cost per dam is estimated at £90. Furrows have been made and plots marked out below the dams for rice growing but it is too early to say to what extent cultivators will take advantage of the dams this year.

AGRICULTURAL EDUCATION AND PROPAGANDA

Four pupils from the Western Province completed their course at the Ukiriguru Training School and were appointed African instructors ungraded. Five entered the training school in January and nine probationer instructors were under training for entry to Ukiriguru in 1947.

Two instructors proceeded to Morogoro for an entomological course and two men were sent to Morogoro to be trained in nursery work.

The increased food production drive was continued during the year. The main crops included in the increased production campaign in Unyamwezi were sorghums, bulrush millet, cassava and paddy. In the Kigoma area special attention was given to paddy and maize.

The campaign for the full use of manure and for increased production of manure also continued. Most of the available manure in Unyamwezi is taken to the fields but there is a great deal of resistance to increased manure production. Until easier methods of transportation are introduced other than head loads this resistance is likely to continue. A number of steel wheelbarrows were also sold to Africans for transporting manure but adequate supplies to meet this demand were unobtainable.

Instruction in compost making was given to Tabora prison farm, Tabora boys' school and Tabora girls' school.

Lectures given to the boys in the higher classes at Tabora school by the Agricultural Officer and the Agricultural Assistant, Tabora, were highly appreciated.

MISCELLANEOUS MATTERS

Mr. Lunan Agricultural Officer spent a few days in Mpwapwa identifying grasses in the Western Province collection. Mr. Ellis, Field Officer, Kigoma, visited the Lunzuwa Agricultural Station, Abercorn.

A house was built at Kasulu for the head instructor. This is the first house built in the Western Province under the Development Scheme, Houses for African Instructors.

A. Pitcairn,
Senior Agricultural Officer,
Western Province

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Southern Highlands Province

STAFF

European

Mr. F. W. Thomas, Senior Agricultural Officer, was in charge of the province from 1st January, 1947, to 19th September, 1947, when he proceeded on vacation leave.

Mr. R. D. Linton, Senior Agricultural Officer, was in charge of the province from 1st October, 1947, to 31st December, 1947.

Mr. A. H. B. Childs, Agricultural Officer, Iringa District, 1st January, 1947, to 31st December, 1947.

Mr. T. H. Marshall, Agricultural Officer, was in charge of the Mbeya and Chunya districts throughout the year. He was also responsible for the Njombe District from February, 1947.

Mr. B. R. D. Eccles, Agricultural Assistant, Rungwe District, 1st January, 1947, to 30th November, 1947, when he proceeded on vacation leave. The district was vacant for the month of December.

Mr. M. A. Tyrant, Crop Supervisor, was posted to Njombe District from Mbeya on the 16th February, 1947, where he worked under the supervision of Mr. Marshall, Agricultural Officer, Mbeya.

Mr. K. B. Louwrens, Agricultural Assistant, Acting Tobacco Officer, Iringa District, 1st January, 1947, to 31st December, 1947.

Mrs. K. Ehrlich, Stenographer, was employed throughout the year at the office of the Senior Agricultural Officer.

Brigadier the Honourable W. E. H. Scupham, C.M.G., M.C., M.L.C., was chairman and executive officer of the Iringa Production Committee from 1st January, 1947, to 30th June, 1947, when he resigned the executive office. The Agricultural Officer, Iringa, Mr. Childs, was appointed executive officer which office he held to the end of the year.

African

(a) 2 Grade III L.C.S. Clerks.
3 Grade III L.C.S. Instructors.
3 Ungraded Clerks.
30 Ungraded Instructors, L.C.S.
3 Ungraded Overseers, L.C.S.
25 Food Production Staff Instructors.
5 Soil Conservation Instructors.
6 Probationary and Pupil Instructors.
4 Messengers.
1 Turnboy.

(b) 47 Native Authority Instructors.

WEATHER

Weather conditions were favourable to crop production, rainfall was adequate in all areas of the province. As is normal in good rain years, the higher altitudes suffered from excessive wet conditions towards harvesting time, resulting in reduced yields of maize, beans, eleusine and sorghums is these areas. The lower areas, which in dry years suffer from drought, produced excellent crops.

Rainfall figures (in inches) from the districts for the last four years:—

	1944	1945	1946	1947
Iringa	37·94	35·79	21·36	34·76
Njombe	57·15	45·70	38·19	43·10
Tukuyu	96·13	129·33	79·15	109·81
Mbeya	37·83	39·57	37·40	37·87

Seasonal annual rainfall (in inches) for the Iringa District is given below and is more or less applicable to all districts excepting Rungwe:—

	1943–44	1944–45	1945–46	1946–47
August	–	–	–	–
September	0·27	–	–	–
October	–	1·73	–	–
November	0·84	6·76	0·17	0·78
December	1·86	8·13	5·20	6·44
January	4·01	9·77	2·59	10·78
February	2·38	7·98	1·82	3·03
March	6·40	7·14	4·18	5·67
April	9·48	4·43	4·51	6·07
May	0·37	1·04	1·03	1·00
June	–	0·06	–	0·86
July	–	–	–	–
	25·61	47·04	19·50	34·63

NATIVE CROPS

Maize.—Maize production throughout the province was excellent and a record, marketed production being more than double that of 1946. Mbeya District alone shows a decrease in the amount marketed but was due to lack of demand and transport difficulties, rather than decreased production. The large crop this season, apart from the ideal weather conditions, can be accounted for by the spur of acute maize shortage during 1946, propaganda and, to a certain extent, the paying of maize planting grants to natives. Two native farmers in the Iringa District planted 67 and 45 acres respectively and, in all, 19 cultivators produced 1,092 bags for sale for which they received Shs. 4,203/-. Maize production in the Njombe District and at all higher altitudes in the province was again only fair due to the moist conditions towards harvesting time. There is no doubt that in those areas wheat must ultimately replace maize as the staple food. Propaganda is being carried on to this effect and results are now to be seen in the increased acreage planted to wheat.

Improved maize seed was distributed to natives. It can now be said that resulting from these distributions of selected maize seed in the province, that 40 per cent of the maize marketed is of better quality.

The cultivation of maize by natives still leaves much to be desired. Late planting is often the cause of poor yields. Most natives prefer to plant late so that the maize need only be weeded once, whereas, early planted maize may have to be weeded two to three times when, if it is not done, as is often the case, the crop yields no better than late planted maize.

Rice.—A steady annual increase in the acreage planted to paddy has been maintained and some 11,000 acres, it is estimated, were planted to paddy this year. Production increased by some 561 tons, the marketed crop amounting to 3,382 tons. The cultivation of rice is fairly satisfactory, most cultivators now ploughing their land. Seed is still broadcast in spite of the native cultivators being aware of the better yields obtained from transplanting. The reason for this is that most rice growers cultivate very large areas and have insufficient labour to transplant when they should do so. No figures of total yields have been obtained, but based on the amount marketed, production per acre was 684lb., an increase on last year's figure of 31lb. per acre.

The small rice growing areas of Idodi, Pawaga and Usagara marketed five tons only this year. The Pawaga growers were ordered to retain their crop against possible food shortage in 1948.

Production of paddy in the province for the last four years was: 1944, 3,000 tons; 1945, 1,154 tons; 1946, 2,821 tons; 1947, 3,382 tons.

Wheat.—Wheat growing in the province is gaining favour with the natives at the higher altitudes. Large introductions of seed were made to the province this year as under:—

Njombe: 56 bags 117A
56 bags Sabanero
40 bags 192
Iringa: 8½ bags experimental wheats
Mbeya: 112 bags

Very little surplus wheat came to the markets, in fact, only in the Iringa District were 2·8 tons sold as compared with 0·5 ton last season. There was surplus wheat in the Njombe District, but the natives refused to sell at a market kept open for a fortnight, considering the price offered too small.

Beans and Peas.—Good crops of beans and peas were obtained in the Rungwe, Njombe and Mbeya districts. Bean growing in the Iringa District is hazardous due to the unsuitability of the climate and soils. Peas did well at the higher altitudes and good crops were harvested.

Production in the province for the last four years was as follows: 1944, 575 tons; 1945, 298 tons; 1946, 245 tons; 1947, 625 tons.

Eleusine.—Large areas were again planted to eleusine mainly for the purpose of brewing beer. Efforts have been made to change the system of cultivation of this crop. In this connection the Agricultural Officer, Iringa, describes the two systems as follows:—

"The method of cultivation of this crop has been changed from 'ihonyo' to 'ilongo'. The 'ihonyo' system consists of chopping of all small branches of the trees in the area to be planted and placing them around the trunks; in the dry season they are set on fire. The eleusine crop is then planted on the burnt land. In the second year the remaining branches are chopped from the tree and again placed around the trunk and burned. In the third year the tree is generally dead and no branches remain, so it is necessary to move on for further denudation. The results of this method are disastrous, especially in the 'miombo' areas of Malangali where large areas of 'miombo' denuded of all natural cover are eroding visibly year by year.

"The 'ilongo' system consists of breaking land and forming large ridges at the end of the rains and planting at the beginning of the rains the following season. Generally one crop is taken, after which the land is then turned over to maize planting."

The new system was enforced by order and, although results were not impressive, a start on the control of eleusine planting has been made.

European Potatoes.—Last season's plantings were mostly destroyed by blight in the Iringa District. Good crops were harvested in the Mporotos area of the Mbeya District as also in Rungwe, where potatoes were planted late and ripened in the dry weather. The dry season's plantings of potatoes in Iringa in the valleys were, this year, badly infected with the condition known as internal brown fleck. This condition has not been observed to any serious extent in previous years. Potato growing can only improve in the province with the distribution of blight free varieties.

Production (in tons) in the last four years by districts was as follows:—

	1944	1945	1946	1947
Mbeya	1,000	291	236	600
Iringa	20	40	100	100
Tukuyu	–	3·7	8·1	18·2

Sweet Potatoes and Cassava.—Sweet potato and cassava yields were generally good throughout the province. Certain semi-famine areas were supplied with cuttings of sweet potatoes and cassava and the natives ordered to plant these with a view to building up reserves of food, should other crops fail.

Coffee.—Native coffee production was up to average, production being as undernoted (in tons):—

	1944	1945	1946	1947
Mbosi	31	54	9½	32
Rungwe	183	194	147	194

The standard of upkeep of the native coffee plots was fairly good, abandoned plots requiring attention. Growers, after a poor year, as last year, seek work in other districts and leave their plots in the hands of relatives with the result that the plots become sources of infection of pests and diseases to upkept plots surrounding them. In the Mbosi area the European Coffee Growers' Association complained of this state of affairs and action for the uprooting of these plots is now in hand. The natives of the Mbosi area are in process of forming a co-operative society.

Sunflower.—From seven bags of seed distributed to natives last year some thirty tons were marketed. Sunflowers are apparently well suited to the province. A campaign for large scale production was carried out and seed distributed to enable all natives in the province, in suitable areas, to plant this crop next year.

Onions.—Onions have been grown in a small way to meet local needs in all districts of the province. Three hundred pounds of Bombay Red Onion seed was imported and distributed to natives during the year.

This introduction produced a crop between thirty to forty tons, but at harvest time it was impossible to find a buyer. The crop therefore will not be encouraged in the future as it is apparent local needs are already met.

FOOD SUPPLIES

Food supplies for natives and the requirements for fed labour were ample throughout the year and large surpluses available for export. Semi-famine areas, such as Pawaga in the Iringa District, were supplied with quick maturing seed of winged cowpeas, obtained from Morogoro, yellow maize and cassava cuttings. Instructors were posted to the area to ensure the planting of these seeds and it is hoped, in this way, to overcome the recurrent shortages in the Pawaga area.

Storage schemes for the province have not yet been finalized but it is understood the matter is being dealt with.

MARKETING

The marketing system in the province worked satisfactorily under the ægis of the produce control. There were no difficulties in marketing of the crops other than rice in Rungwe and maize in the Mbeya District. Marketing of these crops was held up due to the inability of the Tanganyika Railways to evacuate the produce.

In the case of Rungwe rice, by the end of September all stores were full and, although the Railways had not objected to this prospect of lifting rice so as to release storage for continuing intake in producing areas, no firm arrangements had been come to. The millers were naturally reluctant to continue operating and buying was suspended. During this period the Agricultural Assistant estimates that hundreds of tons of paddy were sold to Nyasaland. Finally, agreement was made with the Nyasaland Railways to evacuate the crop, but they also failed in the undertaking. The markets were reopened in November. This was made possible by the exiguous takings of the lake steamer when small storage space again became available. Better transport facilities are hoped for next year, when, with three mills operating in the area, the marketing of the crop presents no difficulties provided evacuation is prompt.

The price paid for paddy was fourteen cents. This price was paid as in past years, to compete with the Nyasaland price of a penny and three-quarters which was instituted by Nyasaland to stimulate wartime production.

As with the rice crop, maize marketing in the Mbeya District was disorganized resulting from the inability of the Railways to evacuate the crop. Wet maize markets were opened. The maize purchased from these markets was not evacuated by the time the dry maize should have been bought, the reason being that the Railways were still occupied in evacuating the 1946 rice crop. This hold-up resulted in the markets not being opened until 1st August, 1947, two months later than usual. Adequate transport facilities are essential in the province if marketing is to be satisfactory.

The coffee crop was, for the first time, handled by the new co-operative societies. There are now ten societies in the province as follows: One Mbosi Coffee Growers' group, five Rungwe Coffee Growers' groups and four Rungwe Rice Growers' groups.

The societies functioned smoothly, but it may be that there will be difficulty with some of the groups due to their interference in politics. The societies have memberships varying from ninety to fifteen hundred.

The main items of produce marketed in the province were as undernoted (in tons):—

	1945	1946	1947
Maize	3,144	3,270	8,002
Paddy	1,154	2,821	3,367
European Potatoes ...	67	244	618
Beans and Peas	298	244	625
Wheat	110	98	50
Coffee	248	158	610
Sunflower	–	–	315
Vegetables	–	–	260

The above produce marketed during 1947 was obtained from the districts as follows:—

	Iringa	Mbeya	Njombe	Rungwe
Maize	5,583	1,145	187	1,087
Paddy	5	–	–	3,367
European Potatoes	–	600	–	18
Beans and Peas	76	274	133	142
Wheat	50	–	–	–
Coffee	–	416	194	–
Sunflower	290	–	25	–
Vegetables	120	120	–	20

No figures for Chunya are available.

NON-NATIVE CROPS

Pyrethrum.—Production of pyrethrum dropped to 679,949lb. This reduction in the crop was due to nine planters accepting the government offer to compensate them for going out of production from June to December. The balance of the pyrethrum growers continued to receive the contracted price.

Monthly production and production by grades for the various areas in the province were as follows:—

	Tukuyu	Dabaga	Njombe	Mufindi	Sao Hill	Lupembe	Mbeya	Uwemba
January ...	373	6,888	–	4,791	5,668	–	4,541	27,482
February ...	–	34,710	–	16,029	2,666	–	1,418	102,651
March	–	31,671	1,253	10,548	5,310	–	1,414	83,173
April	–	4,878	1,418	4,225	1,457	–	4,273	14,795
May	–	5,283	–	8,016	–	2,481	3,779	5,680
June	–	1,640	225	–	1,257	–	5,475	6,535
July	–	3,849	140	–	696	1,024	–	9,723
August	–	9,000	–	–	–	–	–	17,908
September ...	–	10,721	258	453	2,134		3,495	3,801
October	–	40,796	7,567	860	2,244	–	3,593	31,043
November ...	–	18,792	–	413	1,679	–	4,191	11,227
December ...	–	4,776	–	779	–	–	37,943	38,840
	373	173,004	10,861	46,114	23,111	3,505	70,122	352,858

Production by Grades in 1947

Grade I	Grade II	Grade III
379,609lb.	273,915lb.	26,425lb.

The upkeep of the crop was satisfactory. Planters who accepted the grant were required to cut down their flowers in the field. This order was complied with.

The uncertainty of any future in pyrethrum has caused some planters to dig in their pyrethrum and plant other crops. Other planters continue to deliver pyrethrum without payment in the hope that a suitable price will ultimately be given them. There is no information of a price being decided on.

Tobacco.—Weather conditions were more or less suitable for the tobacco crop. The season was a little too wet to begin with, but throughout most of the growing period, was ideal. The estimated crop was obtained

The 1947 crop amounted to 749,389lb. and was generally of fair quality. A new variety of tobacco, namely "Ehlers", was introduced and gave satisfactory results. This tobacco is evidently suitable to the area, is a heavier yielder and is acceptable to the buyers. Growers planted practically only Ehlers this year, the Assistant Tobacco Adviser giving the figure at 99 per cent. Permits were issued for the planting of 5,300 acres, this is an increase of 3,200 acres planted to tobacco. The 1948 crop is expected to amount to 2,000,000lb.

Grading commenced on the 24th March, but deliveries were slow as several planters refused to deliver their crop, demanding permission from the Tobacco Board, to grade on their own farms. The board continued to hold firm to their decision that all grading must be done at the shed, until August, when, due to the processing boiler being out of order and with congestion due to lack of transport, the board was forced to permit certain farmers to grade their own crop. Grading was completed on 11th November. Tobacco handled at the shed during the year was as undernoted:—

	lb.
Pregraded but processed and baled at the shed	21,372
Graded and baled at the shed	189,184
Graded, processed and baled at the shed	334,254
Tobacco scrap graded and baled at the shed	61,633
Tobacco scraps graded and baled at the shed for nicotine ...	6,106
Graded and baled on the farms	225,848
Total ...	838,397

GENERAL

The running of the tobacco industry was as usual beset by difficulties throughout the year, so much so that a select committee was appointed by Government to meet the planters. This situation arose as a result of a request submitted to Government from the Tobacco Growers' Association for an "enabling clause" for "one-channel marketing" of the crop. The enquiry was the result of protests from planters who had not been present at the meeting. The enabling clause was duly passed, but no action in regard to one-channel marketing has yet been taken. The planters, due to the board's policy of one-channel marketing and insistence on tobacco being graded at the shed, passed a vote of no confidence in the board at a meeting of the association held in May, when the members of the board resigned from the association. As a result of the vote of no confidence, and the fact that a loan was being asked from Government for the extension of the grading shed, the members of the board, not wishing to take responsibility for a loan they would not handle, their term of office expiring at the end of the year, asked to be relieved of their office before their term was completed. The Government accepted this and a new board was appointed. The new board obtained a loan from Government of £13,000 for the purpose of

extending the grading shed and installing new and adequate processing plant for the handling of the anticipated increased production of tobacco in the next few years. They further decided that all tobacco will be graded on the farms. Work was commenced on the new building in December, but at the time of writing this report it is very much doubted whether the plant can be obtained and installed in the buildings in time for this year's crop.

With the high prices ruling for tobacco during the year, many planters who had left the district in 1946 returned. There being no suitable farms available, these planters and others farming in unsuitable areas pegged land in the Nduli and Mloa areas of the Iringa District. Some 69 applications for farms were made. In view of the fact that the land was required by the end of August, the Land Officer decided that alienation could not be made in 1947. He, however, requested the Iringa Production Committee to select ten names from the applicants for submission to Dar es Salaam, when six applicants would be selected, four for Mloa and two for Nduli to be given farms, looked on as experimental for the first year. This was carried out and the six farms were allocated and occupied by the selected applicants.

The tobacco lands on the old farms are infested with eelworm and in many cases the land exhausted. With the introduction of the variety Ehlers, which is a heavy producer, yields will increase, but there is no doubt that new land is necessary to maintain and increase production in the future. Early action in alienating land at Mloa and Nduli will be necessary in 1948 if the figure of 5,000,000 has to be attained.

Maize.—The acreage planted to maize by Europeans increased considerably, being encouraged by the maize planting grant of Shs. 32 - per acre and the bonus of Shs. 3/85 per bag sold. Tobacco planters were required to plant an equal acreage of maize and tobacco, this being a condition of all tobacco planting permits issued. One thousand, six hundred and sixty-four tons of maize were marketed by Europeans. This does not indicate the actual production as all planters retained their requirements for fed labour. The above applies to the Iringa District only.

Maize grown by Europeans in the Mbeya and Rungwe districts gave very poor results. In Rungwe, the crop failed due to excessive rain and in at least one case in the Mbeya District the failure was due to neglect by the farmer to upkeep the crop.

Coffee.—The Mbosi coffee production amounted to 383 tons of parchment; this is an increase on last year's crop of 323 tons. Production for the last four years was as follows: 1944, 115 tons; 1945, 305·9 tons; 1946, 60 tons; 1947, 383 tons.

The upkeep of the estates was satisfactory.

Tea.—Weather conditions for tea were anything but ideal, although precipitation was above average. Rainfall was heavy in April and May, but June, July and August, normally damp and misty, were sunny and dry months causing early drying out of the soil. The showers usually obtained in August and September also failed, resulting in a fall in the yields of tea towards the end of the year. Rainfall in the tea areas was as undernoted:—

Rungwe	...	105·98 inches.
Mufindi	...	65·30 inches main forest area.
Lugoda	...	51·72 inches on edge of forest.
Mufindi East		47·17 inches on edge of forest.

The crop in the Mufindi area decreased for the reasons given in the preceding paragraph and the resting of certain gardens. Production was as under:—

	1945		1946		1947
	lb.		lb.		lb.
Custodian Estates	–	...	596,728	...	509,515
Tanganyika Tea Company	–	...	18,345	...	64,442
Mufindi Tea Company	–	...	56,194	...	being rested
	559,243	...	671,267	...	573,957

Rungwe estates also were affected by the peculiar climatic conditions in June, July and August, yields being reduced in the last few months of the year. Production was as follows:—

	1945	1946	1947
	lb.	lb.	lb.
Chivanje Estate	50,794	128,600	101,034
Tanganyika Tea Company	269,677	341,860	353,523
	320,471	470,460	454,557

The crop for the province was 1,028,514lb. a reduction on last year's figure of 113,213 lb. The main decrease, it will be noted, was at Mufindi. This emphasizes the changed climatic conditions of that area and points to the urgency of a reafforestation programme. Humidity during the months of June, July and August are an essential to production of tea from October to March, the main production months. To illustrate this, given below are the monthly production figures available for the last three years:—

	Chivanje Estate, Tukuyu			Tang. Tea Co., Mufindi			Tang. Tea Co., Tukuyu		
	1945	1946	1947	1945	1946	1947	1945	1946	1947
January ...	6,197	10,630	16,847 ...	–	93,021	85,999 ...	23,408	41,882	40,443
February ...	5,263	–	10,826 ...	–	95,974	72,106 ...	20,815	47,957	35,692
March ...	6,573	–	11,836 ...	–	66,799	62,288 ...	24,215	41,655	44,205
April ...	5,301	–	11,800 ...	–	82,861	80,453 ...	15,057	35,646	42,755
May ...	3,949	10,641	8,391 ...	–	64,512	47,865 ...	10,951	26,007	23,946
June ...	–	8,313	4,325 ...	23,450	25,194	29,140 ...	8,329	13,436	15,195
July	–	–	4,453 ...	11,181	13,584	16,742 ...	7,672	9,700	12,519
August ...	4,297	–	4,634 ...	12,566	8,643	16,999 ...	8,469	7,651	20,794
September ...	8,611	–	9,220 ...	22,379	20,267	34,396 ...	32,825	30,922	33,999
October ...	–	–	9,152 ...	77,127	94,958	63,158 ...	49,360	48,469	38,316
November ...	7,411	–	3,559 ...	51,595	66,257	36,436 ...	24,764	7,669	17,124
December ...	9,765	–	5,991 ...	19,301	39,197	28,375 ...	55,591	30,866	28,535
	50,794	128,600	101,034 ...	559,243	671,267	573,957 ...	267,677	341,860	353,523

The estates were well upkept. Infilling was carried out and a large proportion of the infills are flourishing. As mentioned in last year's report, infilling is not successful in established tea and the companies are now only infilling in young gardens or in older tea when pruned. Thirty maunds of seed were obtained from India and forty-two maunds from Kenya. Seed was also obtained from seed bearers in Tukuyu. All seed was planted in nurseries. Seedlings are sufficient to carry out infillings next year. Pruning was carried out as necessary.

On Custodian property 349 acres of new clearings were planted, leaving a balance of 72 acres to be planted in 1948, to complete the programme. At Kivero 76 acres were planted on the Tanganyika Tea Company property. These plantings are in small clearings in forest, are reported to be in fine condition and the percentage of vacancies will be low.

Wheat.—Production amounted to 47 tons. This is a decrease of 51 tons on last year's crop. The reason for the decrease is economic, farmers not finding the production of wheat at Shs. 27/50 per bag profitable, when Shs. 21/- is obtainable for maize.

Harvesting and threshing machinery were unsatisfactory; harvesting was done by hand, threshing in an inefficient machine. The Kenya Farmers' Association have now purchased modern threshing machines which the farmers can hire next year. Production figures for the last three years are as follows:— 1945, 110 tons; 1946, 99 tons; 1947, 47 tons.

Sunflowers.—With a fair price being offered for sunflower seed and the demand for oil, sunflower was introduced as a cash crop to the planters, when 290 tons were produced. This sold at £26 per ton f.o.r. Iringa. Sunflowers grow well throughout

the province and, should prices remain at an economic level, there is no doubt that sunflowers will have their place in the rotation in mixed farms as a cash crop.

Vegetables.—The vegetable requirements of the Polish camps and private consumers in the province were met from local production. Vegetables were also exported to Dar es Salaam, Kongwa and Williamson's diamond mines. With the demand from these large undertakings for weekly supplies of fresh vegetables, farmers have now planted large areas to vegetables. The vegetables are transported from Iringa by air to the various destinations in the Territory.

PESTS AND DISEASES

Crops were reasonably free from pests and diseases throughout the year with the exception of maize, which was heavily attacked by stalk borer, and potatoes, which were again practically wiped out by late blight. Pests and diseases observed in crops are as listed below:—

Pests

Coffee:	White and yellow borer were much in evidence in the Rungwe and Mbeya districts in Native coffee but control drives were organized and the position is stated to be in hand. Antestia—average year.
Maize:	Stalk borer was very active and caused considerable damage. Uprooting and clearing of stubble was practised.
Potatoes:	Ladybird was reported from Dabaga but caused little damage.
Vegetables:	Aphis attacked vegetables of the cabbage group and caused damage.
Pyrethrum:	Thrips caused the usual seasonal damage to the crop but were no worse than in previous years.
Tobacco:	Eelworm—general throughout the tobacco fields. Cutworm caused damage to young seedlings. Earth fleas caused damage to seed beds. Snails also caused damage to young plants in seed beds. White fly caused less damage than in previous years.
Fruit:	Goat moth caused damage by boring, but is now controlled by injection of dieseline.

Diseases

Maize:	Ear rot caused damage in the high rainfall areas. Maize streak and leaf blight were observed but caused no damage.
Potatoes:	Late blight—present in all areas, wiped out early plantings. Early blight—observed but caused little damage. Scab—observed on potatoes in land which had been continuously cropped. Brown rot—observed in the Dabaga and Sao Hill areas of the Iringa District. Measures of control have been taken.
Wheat:	Stem rust—considerably damaged early planted wheat in the forest area. Leaf rust—practically all wheat infected but little damage done. Loose smut attacked only Sabanero. Glume blotch—observed only in the forest areas.
Beans:	Rusts were observed on beans early in the season.
Tea:	Amillaria caused the usual amount of deaths during the year.
Sunflowers:	Mosaic—observed in sunflowers. *Sclerotinia* caused considerable damage to sunflowers. Control measures were taken.

Tobacco: Kromnek was observed in tobacco and sunflowers. This disease is still under investigation; Dr. Wallace being, at the time of writing, in the province for the purpose of continuing his work on this disease.

Angular spot was present in tobacco but no severe damage was caused.

SOIL CONSERVATION

Progress in the control of erosion is to be recorded. Reports from the districts are as follows:—

Iringa: Native Areas.—The soil conservation rules which were passed late last year came into force. The rules were explained at all barazas and at all jumbeate centres. This being the first year of the rules they were not enforced too rigidly. Road tracers were issued to all instructors, after each had gone through a course of instruction. The following measures were enforced:—

1. The cultivation of all crops by the "ihonyo" system was forbidden, except in five jumbeate areas.
2. The indiscriminate burning of grass was forbidden.
3. The closing of gaps between ridges was enforced.
4. Cultivation of land near streams or gulleys was forbidden.
5. All cattle manure was to be applied to the land.
6. All ox-plough owners must register their names and put contour banks through their fields at five-foot vertical intervals.

The forbidding of the "ihonyo" system of cultivation did definitely reduce fires in the Malangali area this last season. The rule is extremely unpopular, but it is evident that if the eroding of this area is to be arrested this system of cultivation must cease.

It is quite impossible to control burning. An attempt was made to get everyone to burn early. The idea being that in the dry season the fires would not spread as they had in the past. The attempt was not very successful.

Iringa: Non-Native Areas.—Every farm in the district has now been laid out for contour banks or some other system of anti-erosion measure. Many farmers have taken advantage of this and put in contour banks, but many have not. On the Custodian farms measures have been taken in nearly every case. This is mainly due to the co-operation of the Assistant Custodian of Enemy Property who is insistent that these measures be carried out.

It is difficult to get the non-native farmers or planters to take anti-erosion measures as there is no legislation enforcing them to do so. In the case of a year to year agreement it is hardly fair to ask a farmer to put in an elaborate system, which might cost him a considerable amount of money. The contour bank has been advocated, for this reason, it is cheap and quite effective. It does interfere with tractor cultivation; this being its only drawback.

Several farms in the district are very badly eroded and portions of them should be put under bush fallow, as they have passed the stage where runoff or gullies can be stopped by contour banks. A pamphlet on forming broad-base terraces was issued by this office.

Mbeya.—During the year a gang consisting of one senior instructor and nine instructors has been continuously employed on anti-erosion measures. In general, and after a poor beginning, good progress has been made particularly in Mbwila and the Porotos Mountains of Mbeya. This progress was made possible by the full co-operation of the newly appointed chief of the Wasafwa. Even so, a lot more yet remains to be done and other areas are in need of urgent attention. Tours have been

made with officers of the Administration and barazas addressed in order to get natives interested in the work. A disturbing and contributory factor in soil erosion is the continuing unchecked cutting down and burning of trees, particularly on steep hill-sides, in order to grow eleusine, and large areas, notably in Mbosi and Ruanda are being rapidly denuded of trees and erosion is thereby accelerated.

Tukuyu.—It is still proving most difficult to persuade the natives that the surveyed contour banks must be regarded as permanent. Generally speaking they still persist in planting crops on them and, as a result, by the end of the season they have almost disappeared and new ones are made often with no supervision and completely off the contour. In all the local rules it is not definitely stated that all contour banks must be regarded as permanent and must be grassed. It will, however, take some time before the present tendencies can be overcome.

During the last months of the year strenuous efforts were made to stop the planting of crops on the contours and, in many cases, established crops were uprooted as it was felt that, unless firm steps were taken, the battle would be an endless one. Fortunately most crops in the district are grown on contour ridges and control in the cultivated areas is good.

Grass fires are a problem in the province. A serious attempt to control them was made last year and although results were not spectacular, a move in the right direction has been made. Only a few years ago the native cultivator took no erosion control measures of any kind; today it is rare to see a plot without them. If control of burning is continued on the energetic lines of last year there is no doubt that these destructive annual fires can be controlled.

EXPERIMENTAL WORK

Reports from the districts on experimental work are as follows:—

Mbeya

Coffee.—All the old plants of the thirty-six varieties of coffee under trial at the Coffee Variety Trial plot at Mbosi have been uprooted. Seed of the six varieties selected for further trial have been sown in nurseries and have given good germination. The whole plot will be replanted to these varieties in four Latin squares during the coming planting season.

Tobacco.—Further trials were made with tobacco, *Nicotiana rustica*, for high nicotine content. The trials were made at different elevations and under different climatic conditions at Mbimba (Mbosi), Runda, Porotos and Chimala, where adequate supervision could be given during the growing season. At all places the seed germinated well and good stands from transplanting were obtained. A sample of the cured leaf was sent for analysis, with the following results:—

	Per cent
Moisture (dried to constant wt. at 105°c-110°c)	14·7
Nicotine (on sample as received)	10·3
Nicotine (on dry matter basis)	12·0

The results of the trials were disappointing and discouraging and the trials are not being continued.

Flax.—The trials were continued from last year. The seed was sown in lines and not broadcast, the seed rate being 65lb. to the acre. All plots were dug over twice before the seed was sown, and in every plot the seed germinated well. When the plants were a few inches high the plots were hand-weeded. Neither dodder nor wilt was seen at any time in any of the plots, the variable results obtained being due to soil and climatic conditions.

Flax Trials 1947, Mbeya District

1. Njiapanda (Mporotos). Elevation 6,000 feet. Annual rainfall 50-60 inches. First plot planted 26th December 1946. Harvested 23rd June 1947. Yields:—

	lb. per acre
Straw with seed	2,484
Straw deseeded	2,112
Cleaned seed	328

Second plot planted 15th January. Harvested 9th August. Yields:—

	lb. per acre
Straw with seed	2,710
Straw deseeded	2,161
Cleaned seed	328

2. Uyole (Mporotos). Elevation 5,500 feet. Annual rainfall 50-60 inches. Planted 5th February. Harvested 9th June. Yields:—

	lb. per acre
Straw with seed	2,992
Straw deseeded	2,624
Cleaned seed	354

3. Mbosi. Elevation 5,000 feet. Annual rainfall 50 inches. First plot planted 14th December 1946. Yields:—

	lb. per acre
Straw with seed	1,126
Straw deseeded	985
Cleaned seed	70

Second plot planted 10th January 1947. Yields:—

	lb. per acre
Straw with seed	1,232
Straw deseeded	985
Cleaned seed	105

4. Usangu (Chimala). Elevation 4,000 feet. Annual rainfall 25-30 inches, but very uncertain. Planted 11th January. Harvested 5th June. Yields:—

	lb. per acre
Straw with seed	1,036
Straw deseeded	985
Cleaned seed	17

The second plot at Chimala was planted on 19th February and was a failure, only 281lb. of straw with seed being harvested.

5. Usangu (Iguruzi). Elevation 4,000 feet. Annual rainfall 25-30 inches. Planted 10th February. Harvested 3rd July.

	lb. per acre
Straw with seed	1,408
Straw deseeded	1,126
Cleaned seed	64

6. Runda. Elevation 4,500 feet. Annual rainfall 35 inches, but uncertain. The first planting was ruined by ants and no reliable figures can be given.

Second plot planted 8th February. Yields:—

	lb. per acre
Straw with seed	1,309
Straw deseeded	952
Cleaned seed	116

Wheat Trials, Njombe.—The crop supervisor reports that the variety of wheat 294 A.N. 5. B. 3 was planted too early and before the end of the heavy rains. As a result the yield was very poor, only 24 kilos being reaped from the half acre plot. The variety Regent was planted at the correct time and yielded at the rate of 550 kilos to the acre.

The Wheat plots at Nyumbamwitu (Njombe) were late planted, the yields being :—

Variety : 294 A.N.5.B.3. at the rate of 110 kilos per acre.
Variety : 294 A.N.4.A.1. at the rate of 80 kilos per acre.
Variety : 294 B.2.A.3. at the rate of 76 kilos per acre.

Iringa

Dr. Duthie's Ripping Trials, Iringa District

Mufindi.—There appeared to be little or no change in the vegetative composition density. The ripped plots showed a decrease in vegetative cover as compared with before they were ripped.

It was reported that the ripped plots kept green longer than the rest of the grasslands and that they became green quicker.

Dabaga.—Little change was observed in the plots. Annual weed growth had increased on the ripped plots. The grass cover generally was thicker, but this was thought to be due to the heavier rainfall as compared with the year previously.

All the ripped plots showed a far thinner grass cover than the control and the unripped.

Rungemba.—Annual weed growth had increased enormously and many more grass species were observed than at the time of clearing.

Generally the cover on the ripped plots had decreased and the annual weed growth increased.

Taking the three trial blocks as a whole, there has been no outstanding vegetative change in species or in plant vigour.

Wheat Trials

A report on the wheat trials at Dabaga was submitted with the monthly report for December 1947.

Tukuyu.—The departmental farm was maintained throughout the year. The coffee gave a poor crop, only 48 kilos being harvested. It is suspected that most of the crop was stolen.

IRINGA DISTRICT PRODUCTION COMMITTEE

The Executive Officer reports on the working of this committee as follows :—

During the year the following loans were granted to farmers :

	Shs.
Crop loans to twelve farmers amounting to ...	115,000
Machinery loans to nine farmers amounting to	141,000

Repayment and Interest on loans were paid to the full in every case, with the exception of one, this was unavoidable as the borrower died, however, the first instalment was paid later. The amount of repayments was Shs. 27,300/-.

The maize planting grant was paid to thirty-two farmers and amounted to Shs. 119,220/-. The maize bonus was claimed by ten farmers. The acreage of maize planted was as follows :—

	1945/46	1946/47	1947/48
Acres	3,782 ...	7,030 ...	6,659
Yield in bags	13,547 ...	24,591 ...	28,810
Bags per acre	3½ ...	3½ ...	4½
Acreages of wheat :—			
Acres	998 ...	590 ...	337
Yield	1,595 ...	944 ...	674
Bags per acre	1·6 ...	1·6 ...	2·0

Items Discussed at Meetings

Minimum Returns.—This was paid to one farmer in respect of twelve acres of wheat he was ordered to plant.

Land Settlement Committee.—It had been proposed by Government that the Iringa Production Committee should combine its functions with a local settlement committee, if and when formed.

Land Bank.—It had been suggested by Government that the Iringa Production Committee should act in certain matters as agents for the land bank when formed.

Additional Members of the Committee.—It was suggested that a Greek member should be added to the committee, so as to form a representative body of all communities. Mr. V. P. Tofas was elected as the new member.

New Tobacco Farms.—The committee was asked to choose ten candidates for five proposed tobacco units of 500 acres which were to be alienated (three at Mloa and two at Nduli). There were 69 applicants which included Asian and Europeans, the ten candidates were named.

Machinery.—Ten per cent of the ex-wheat scheme machinery was allocated to the district. The Iringa Production Committee was asked to reallocate to farmers. This amounted to:—Three tractors, three ploughs, three harrow ploughs, three disc harrows, three combine harvesters and three spring tooth harrows. The last two items were not applied for, the first four were all taken up. In addition the district was offered three tractors and four harrow ploughs.

The present committee consists of the following persons—Chairman: Brigadier the Hon. W. E. H. Scupham, C.M.G., M.C., M.L.C.; Executive Officer: The Agricultural Officer, Iringa District; Members: The Senior Agricultural Officer, the District Commissioner, C. E. Hallam (English), J. G. de Brito (Portuguese), R. K. Manji (British-Indian), V. P. Tofas (Greek), A. J. E. Lock (English), Captain Macartney-Snape, M.C. (Australian).

SEED DISTRIBUTION

Seed was distributed in the province as follows:—Yellow maize 6 tons, wheat 19 tons, groundnuts 7 tons, beans 4½ tons, peas 1½ tons, sunflowers 25 tons, onion 300lb., rice 15 tons.

Seeds of brown and white mustard, peas and oil palms were introduced. The mustard arrived too late for trial and will be planted next year. The oil palm seeds were planted in nurseries in the lake shore area of Rungwe. Germination at the end of November was reported to be—Kangulla 30 per cent, Deli 7·6 per cent. The pea seed received from Messrs. Chivers and Sons, Ltd., England, also arrived too late for planting and will be planted next year at Uwemba, Njombe District. The pea trial is for seed purposes.

EDUCATION

Short refresher courses of instruction were given in all districts in the province to the departmental and native authority agricultural staff. Mr. Marshall, Agricultural Officer, Mbeya, conducted the courses which were mainly concerned with field work.

PIG INDUSTRY

Mainly due to the financial position of the bacon factory and their inability to buy in pigs, pig production in the Iringa District had practically ceased. In view of the fact that it is considered that profitable farming in the area must, to a certain extent, be related to the production of stock on account of the distance of the province from railhead, an attempt was made to revive the growers' interest in production. A pig growers' association was formed. This association, with the promise of a definite number of pigs from the growers, approached the Southern Highlands Farmers' Association to take over the factory and organize marketing. The Southern Highlands Farmers' Association agreed to this and approached Government for a loan

to assist them. Government made a "grant in aid" of £2,000 when the factory was repaired and extended. It is understood that the factory products, in small quantities, have already been exported to England. A small private bacon factory also operates in the province at Mbeya.

TOURING BY OFFICERS

Touring by the staff was as undernoted:—

	Nights absent from Station	Days spent in Field
Mr. F. W. Thomas, S.A.O.	64 ...	48 (8½ months)
Mr. R. D. Linton, S.A.O....	13 ...	10 (3½ months)
Mr. T. H. Marshall, A.O.	115 ...	101
Mr. A. H. B. Childs, A.O.	101 ...	87
Mr. B. R. D. Eccles, A.A.	120 ...	46
Mr. M. A. Tyrant, C.S.	329 ...	–
Mr. K. B. Louwrens, T.O.	5 ...	76

GENERAL

The province enjoyed a prosperous agricultural year. Weather was as near ideal for crops as has been experienced for many years, crop yields were heavy and prices obtained satisfactory. The machinery position eased with the allocation of ten per cent of the wheat scheme machinery and native hoes and ploughs were in adequate supply. The tea and pyrethrum industries, however, were not so fortunate. Pyrethrum prospects remain obscure and planters are seeking new crops suitable to the pyrethrum areas. Tea production suffered temporarily from the climatic conditions, particularly in the Mufindi tea zone. Generally, however, with progress made in the control of soil erosion, self sufficiency in food and an exportable surplus of some 10,000 tons of agricultural produce this year, the agricultural position in the province can be said to be satisfactory.

The department's activities having ceased at the Iheme Experimental Station some time ago, the farm was leased to a planter by the Land Office this year. Two Custodian of Enemy Property farms were leased by the department, Mtitu Farm at Dabaga and a tobacco farm on the Kilosa Road. These farms were acquired for experimental purposes.

The staff in the province attended meetings of the undernoted committees, associations and boards:—

Senior Agricultural Officer.—Iringa Production Committee (Member); Pyrethrum Board (Representing Director); Tobacco Board (Representing Director); Tobacco Growers' Association (by invitation); Pyrethrum Growers' Association (by invitation); Pig Growers' Association (by invitation); Tender Board (Member); Housing Committee (Member); Education Committee (Member); Provincial Conference (by invitation).

Agricultural Officer, Iringa.—Iringa Production Committee (Executive Officer); District Education Committee (Member).

Agricultural Officer, Mbeya.—There being no production committee in the Mbeya District the Agricultural Officer carried out this duty. District Water Board (Member); District Education Committee (Member).

The undernoted officials visited the province in connection with agricultural matters this year: The honourable the Director of Agricultural Production, the Deputy Director of Agriculture; the Plant Pathologist; the Deputy Director of the Rothamstead Experimental Station; the Senior Agricultural Officer, Central Province; the Select Committee (tobacco enquiry); the Land Settlement Officer.

In conclusion, I have to thank the officers of the Administration for the co-operation and assistance given to the officers of the department, in the carrying out of their duties in the province throughout the year.

F. W. Thomas,
Senior Agricultural Officer

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Southern Province

STAFF

Lack of staff has been a serious problem in the Southern Province during the past year. Even so, the gods were considerate and the year proved to be the most productive for a great many years. The following officers served in the province :—

Mr. A. S. Stenhouse, Senior Agricultural Officer, stationed at Lindi, was in charge of the province throughout the year.

Mr. R. W. Collett, Agricultural Officer, stationed at Songea until 17th September, 1947, when he proceeded on leave without being relieved.

Mr. F. E. Luscombe, Agricultural Officer, stationed at Lindi, and in charge of Mahiwa Rice Station until 21st October when he proceeded on leave without being relieved.

Mr. K. Johansen, Agricultural Assistant, stationed at Masasi until 18th May when he was transferred to Tabora, and relieved by Mr. D. Morrison, Agricultural Officer.

Mr. T. W. H. Dore, Agricultural Assistant, stationed at Kilwa until August when he was transferred to Dodoma for health reasons, without being relieved.

Mr. J. W. Deacon, Crop Supervisor, stationed at Tunduru throughout the year.

Mr. C. Lockwood, Crop Supervisor, Lindi, from 16th August, 1947, to 30th September, 1947.

The staff of the Ngoni-Matengo Co-operative Marketing Union, with which the department concerned itself was :—

Mr. A. V. Hall, Manager and Assistant Executive Officer of the Songea District Native Tobacco Board, until May, 1947, when he was discharged as unsuitable.

Mr. W. Sibly-Warne, Senior Agricultural Assistant, seconded as Factory Manager until May when he took over from Mr. Hall.

Mr. C. H. Cooke, Field Officer to the Songea District Native Tobacco Board until 30th November when he resigned.

Mr. C. Lockwood, Temporary Field Officer to the Board, from 1st October to the end of the year.

Touring by the provincial staff during the year was as follows :—

	Period	Nights	Days
A. S. Stenhouse, Senior Agriculture Officer	Year	84	32
R. W. Collett, Agricultural Officer	to 17.10.47	85	84
F. E. Luscombe, Agricultural Officer	to 29.10.47	135	42
D. Morrison, Agricultural Officer	10.4.47–31.12.47	117	6
K. Johansen, Agricultural Assistant	to April, 1947	56	24
T. W. H. Dore, Agricultural Assistant	to August, 1947	111	16
J. W. Deacon, Crop Supervisor	Year	172	63
C. Lockwood, Crop Supervisor	16.8.47–30.9.47	–	–

Departmental instructors were posted as follows :—

	Local Civil Service	Food Production Staff	Messengers
Lindi	6	9	1
Mikindani	4	6	–
Masasi	5	7	–
Newala	4	4	–
Tunduru	5	5	–
Kilwa	6	5	–
Liwale	–	–	–
Songea	14	–	1

Other instructors engaged in agriculture were:—

	Native Authority	Songea Tobacco Board
Lindi	–	–
Mikindani	–	–
Masasi	2	–
Newala	1	–
Tunduru	1	–
Kilwa	1	–
Liwale	–	–
Songea	–	34

WEATHER

During the season the most persistent rainfall for many years was experienced generally, in contrast to the previous season when the scantiest rainfall and bad distribution almost nullified the efforts of cultivators. In all areas very good crops were secured and a very large surplus of foodstuffs was produced for sale and export.

Rainfall was heaviest in the southern and central coastal belts. The northern and western areas had more normal precipitation, with all gradations of intensity in between these extremes. This gradation is reflected in the crops reaped. For example, sesame was a poor to moderate crop in Mikindani and the south and central Lindi districts. North Lindi and all of Kilwa had bumper sesame crops.

FOOD SUPPLIES

It is all too seldom that the African farmer has such an abundance at his disposal as fell to his lot this season. The quantities of all food crops harvested has been an embarrassment. The grower managed his harvest, but marketing proved slow and difficult. Gunny bags were in short supply, transport was inadequate, cash was scarce because there were no trade goods to keep it moving, and roads and markets too few to cope. Harbour facilities and shipping have been inadequate also, so that the producer, who has played his part manfully, has much of his produce still in his hands. It is to be hoped that this abundance will not cause a reduction of effort this coming season.

CROP PRODUCTION

General.—The season has been the best in living memory for most crops. Only such crops as sesame and tobacco, which do not flourish under abnormally wet conditions, failed to produce heavily.

The season started with a drive for increased production. This was favoured by two circumstances, viz. the very poor 1946 season and food difficulties stimulated natives to an all out effort and the three preceding seasons had been poor ones, so that soil fertility had not been depleted by the poor harvests to the usual extent. The result was larger and better than usual fields and a much larger harvest than usual.

Sisal.—9,074 tons were exported. There were minor labour difficulties.

Sorghum (*Mtama*).—A very heavy harvest was secured generally. 11,000 tons were sold in produce markets and 4,253 tons exported. Marketing, road transport, handling and shipping facilities were unable to cope with the very large surplus.

Maize.—The crop was a good one, but was somewhat restricted owing to shortage of seed at planting time. 3,236 tons were sold and 1,932 tons exported. Seed supplies for the coming seasons are plentiful.

Rice.—The crop was very good generally. 3,586 tons were sold and 537 exported.

Pulses.—Bumper crops were secured. 6,551 tons were sold and 4,976 tons exported.

Cassava.—A very heavy harvest continues. 3,394 tons were sold and 2,244 tons exported. It is estimated that some 15,000 tons remain unmarketed.

Sesame.—This crop was very variable from poor in the south-central areas to very good in the northern areas according to the incidence of very heavy or moderate rains. 2,817 tons were purchased. Exports amounted to 3,344 tons including 794 tons carry over from the previous season.

Groundnuts.—1,748 tons were sold, and 991 tons exported. Rosette disease took a heavy toll of late plantings and generally yields were poor, especially in the coastal belt.

Copra.—813 tons were sold and 625 tons exported. Of these exports 615 tons were from the Kilwa District. The Lindi and Mikindani production is consumed locally.

Cashewnuts.—An excellent harvest was secured, 1,529 tons were sold and marketing continues. Exports amounted to 1,312 tons including 376 tons carry over.

Wheat.—A bumper harvest was secured and 620 tons were marketed. Exports to Iringa amounted to 350 tons.

Colombo Root.—Only 97 tons were exported. It is considered that the crop was a good one, but preoccupation with heavy harvests prevented extensive collection.

Native Starch.—12½ tons were exported as against 100 tons last year. There was little inducement to prepare this product in view of the abundant harvest.

Roll Tobacco.—126 tons were exported. This is a reduction on last year's 189 tons due to excessive rains.

Wild Rubber.—Owing to the evacuation of the Liwale population to Kilwa no wild rubber was collected this year.

Coffee.—The Songea coffee crop amounted to 32 tons, about the same as last year.

Gum.—61 tons were exported against 196 tons last year.

Mangrove Bark.—3,548 tons were exported against 1,240 tons last year.

Cotton.—The cotton crop was poor owing to excessive rains and pest damage. Niney-nine tons of seed cotton was purchased. The following are the figures:—

District	Kg. AR.	Kg. BR.
Lindi	17,500 ...	1,313
Masasi	12,445 ...	692
Tunduru	31,762 ...	–
Mikindani	31,332 ...	4,688
	93,039 ...	6,693

Leaf Tobacco.—In Songea the rains were moderate but persistent and the tobacco crop was a poor one. Disease, particularly red rust, was widespread and consequently quality was poor. The final figures are not yet to hand.

Beeswax.—51 tons were exported as against 331 tons last year. This product of collection, like other similar products, was neglected because of the abundant harvests. The season was not favourable to wax production.

General.—The exceptionally good season is reflected in the excellent harvests of nearly all crops. Sesame, groundnuts and tobacco are the only crops which suffered from excessive rains. All other products flourished, and native cultivators have enjoyed the best season in memory. This is in contrast to last season which was the worst that could be remembered.

Cassava reserves are abundant and are still in native hands. There is no immediate danger of overselling and new cassava plantings are satisfactory.

The 1948 season has made a somewhat slow start. Heavy showers at the end of November gave place to dry weather again until nearly Christmas, since when satisfactory rains have been experienced in all areas.

MARKETING OF NATIVE CROPS

A great deal of time and consideration was given to the marketing of native produce by administrative officers, so as to ensure that producers got as good a price as possible at the markets. In the Tunduru District, for instance, the traders refused to pay the prices decided upon by the District Commissioner, on the grounds that they did not allow sufficient trading and transport margins. An outside firm then tendered for the purchase of Tunduru produce, and was able to offer slightly higher prices, in some cases, than the District Commissioner's prices. In other areas the prices were accepted with minor adjustments and, generally, marketing has run smoothly although often held up for lack of bags or for transport.

The number of markets and roads of access to them is still inadequate, but during the past year were better than they had ever been. Further improvement can be anticipated.

Cotton markets were more satisfactory than last year and the small crop was purchased without difficulty.

Tobacco markets handled the small Songea tobacco crop without difficulty, but were unsatisfactory in that growers remain dissatisfied and suspicious. This is not surprising when the arbitrary changes of the marketing system and the lax supervision of the markets which have been in evidence, are considered. It will require much tactful, patient and sympathetic handling to restore confidence amongst growers.

The amounts of native produce recorded as marketed in the province were as follows:—

Product	Record Sales Tons	Product	Record Sales Tons
Mtama	10,658	Cashewnuts	1,529
Pulses	6,551	Bambara Nuts	968
Paddy and Rice	3,586	Millet	927
Cassava	3,394	Beeswax	57
Maize	3,236	Colombo Root	50
Sesame	2,817	Gum	25
Groundnuts	1,748	Castor Seed	22

Tobacco figures from Songea are not yet to hand.

COMMUNICATIONS

The bumper harvest has shown up the weakness of the communications of the province. The number of lorries was insufficient to cope with what was marketed. This would have been even more apparent if there had been no hold-up of marketing due to lack of bags. Storage facilities were strained to the utmost and could not cope, so that such produce was carelessly stacked in poor stores or in the open under tarpaulins, and often with no covering whatsoever. The result has been considerable losses when the early rains came.

The inadequate port facilities and meagre shipping services were equally unable to cope with the volume of produce, and so much of it remains to be shipped and is still inadequately stored.

Towards the end of the year, operations ancillary to the groundnuts scheme entailed much activity on road and rail construction, and preparations for the construction and development of the port of Mikindani (Mtwara).

EXPORTS

The following quantities of produce were exported from the province during the year:—

Product	Tons	Value Shs.	Cts.
Sisal	9,074·50	10,098,554	50
Groundnuts	991·11	407,750	84
Sesame	3,344·23	1,265,616	13
Mtama	4,253·90	784,097	65
Maize	1,932·39	359,527	31
Pulses	4,976·19	1,366,497	23
Cashewnuts	1,312·72	432,996	00
Beeswax	51·54	314,096	61
Tobacco Roll	126·50	103,724	56
Cassava	2,244·06	458,931	02
Wil Rubber	–		–
Gum Copal	61·77	76,159	47
Mangrove Bark	3,548·00	600,980	00
Colombo Root	96·99	47,637	00
Native Starch	12·67	4,306	00
Copra	625·31	234,911	51
Other Grains	13·50	5,890	00
Millet	769·71	316,061	95
Rice	536·95	203,782	10

SOIL EROSION

In a season of excessive rainfall one would expect a good deal of soil erosion. In fact there has been surprisingly little, but where it has occurred it has been often spectacular. At Ndanda Roman Catholic Mission, for instance, on 12th February, 1947, the river flooded very suddenly and inexplicably. The Agricultural Assistant describes the incident as follows:—

> "... a wall of water forty feet high and eighty yards wide at the Ndanda Mission tore down the valley removing every tree in its path. Some trees were over five feet thick and two hundred feet long. The area devastated is about six miles long and thousands of trees have been removed.
>
> "... in the lower reaches of the valley many native fields were completely washed away ..."

The Agricultural Assistant assisted in replanting the devastated area with tree seedlings.

The Ruvuma River did not flood dangerously and little damage was done. This was surprising but was due to the fact that no heavy downpours of rain occurred in the catchment area. The rains were persistent but seldom very heavy.

Instruction on contour tie-ridging was continued in Songea with fairly good results. In Masasi results are slower but are gradually becoming effective. Elsewhere Native Authority rules have been less carefully followed due to lack of supervisory staff.

Generally, erosion is not a serious problem in this sparsely settled province, but the dangers and how to overcome them are constantly taught by the instructors. Uncontrolled burning is the most important single factor causing erosion.

INSTRUCTORS' TRAINING

A refresher course for instructors has been held at Mahiwa, and simple tests set to ensure that lessons were being assimilated. There is a gradual but distinct improvement in the standard of attainments of the instructors, thanks largely to Ukiriguru graduates.

PESTS, DISEASES AND VERMIN

Game and vermin have taken their usual toll of native produce during the year, but the losses have not been so badly felt as usual because of the very good harvest. Pig, baboon, monkey, elephant, hippopotamus, warthog, rats and birds have been mainly responsible.

Army worm caused some trouble early in the season. Red bollworm was very prevalent in the Lindi, Masasi and Mikindani cotton crops. The presence of this pest in the North Kilwa District, bordering the Rufiji District has been confirmed by the Entomologist.

Stalk borer in maize and sorghum has been widespread.

Fungus, bacterial and virus diseases were observed. Smut in sorghums, rosette disease of groundnuts, red rust, mosaic, frenching, and angular spot in tobacco, and mosaic of cassava were all noted. Rosette disease of groundnuts and red rust in tobacco were widespread and destructive. Rust in young rice seedlings was also present.

RESETTLEMENT

The very poor harvest of 1946 prevented the movement of Liwale natives into the new settlement areas of the Kilwa District in that year. This meant a much bigger movement during 1947. It was planned to move some 3,651 families. Of this total some 2,800 families arrived in the reception areas, and the remaining 851 families moved of their own accord to approved areas or to other districts. The whole of the Liwale District to the north of Liwale Boma has been evacuated. It is planned to move those living south of Liwale Boma during 1948.

The abundant harvest of 1947 made this movement of the population possible without hardship to them, but added to the difficulties of transporting them with their produce to the reception areas. Available transport was strained to the utmost.

The Agricultural Assistant, Mr. T. W. H. Dore, gave valuable assistance on the agricultural side of this movement of population, until his transfer for health reasons.

THE GROUNDNUTS SCHEME

Plant and equipment began to arrive for the above scheme during the year. Ancillary schemes such as road making, railway surveying and construction, port improvements, exploitation of timber, preparing for oil pipe lines, etc., have all made some progress. The influx of contractors and employees of all kinds is straining local food resources and Lindi, which was always a hungry place, is becoming more and more difficult to live in. Little development has taken place in the actual groundnut areas themselves. Clearings are for experimental purposes only and on a limited scale.

THE SONGEA DISTRICT NATIVE TOBACCO BOARD

The board met under the chairmanship of the honourable the Director of Agricultural Production in the Provincial Commissioner's office in August. The Agricultural Officer, Songea, the manager of the Ngoni-Matengo Co-operative Marketing Union, Ltd., and the Senior Agricultural Officer attended by invitation.

VISITORS

(a) The Deputy Director visited Lindi, Masasi and Mahiwa from 25th to 26th January.

(b) The Entomologist investigated the red bollworm position in the province from 29th July to 4th August.

(c) The Director attended a meeting of the Songea District Native Tobacco Board on 21st August.

(d) Dr. Bunting, Chief Scientific Officer of the Groundnut Scheme, Mr. Martin, Mr. Flynn, Mr. Marchant, and others connected with the above scheme visited this office during the year.

MAHIWA RICE STATION

The very wet season favoured rice production generally so that the difference between the experimental station planting and native plantings was not so marked as in the previous year. Nevertheless the experimental station plantings were markedly better than native plantings.

The spacing trial again gave inconclusive results owing to the marked variability within the plots caused by levelling. The eight-inch spacing tended to give the best results but were not significantly better. This eight-inch spacing was adopted for the other experiments and proved entirely suitable.

The contour plot gave the best results with transplanting (Vs. broadcast) rice close to the contour bank. Differences were not great because of the very favourable season and the results did not give any indication of the desirable vertical interval between contour banks to get the best results.

The silicophosphate trials did not show any reaction to dressings of 2cwt. and 4cwt. per acre. There were indications that the 4cwt. dressing depressed the yields.

The plots receiving a dressing of 1cwt. sulphate of ammonia were significantly better than those which received no such dressing.

Over two hundred selections were made during the season. They were based on vegetative appearance, tiller counts and weight of produce. These selections have since been weeded out until only twenty of them have been planted for further selection.

It was most unfortunate that a heavy flood caused the washing out of the dam constructed for purposes of irrigating the farm and the native lands below it. The site has been inspected by engineers and it is confirmed as the best available.

In the variety trials, Tunduru Sifara gave the best results. Generally the Afaa types (of which Sifara is one) were better then Meli, Bungala or Sindano.

GRASSES

A collection of grasses found at Mahiwa has been made.

OIL PALMS

On the 23rd October, 1947, 1,350 pedigree (Kangala Liscombe) seeds and 1,000 Deli seeds ex Belgian Congo were planted in a fermentation box . After forty-one days the pedigree seeds were transplanted and had given the gratifying germination of 77·7 per cent. The Deli seeds were slower and showed 42·5 per cent germination in fifty-three days. Germination is continuing in the nursery beds.

CATTLE

Twelve Boran cattle and one heifer calf were received at Lindi on 14th December, 1947. One cow was injured en route and had to be slaughtered at Lindi. Her fully developed calf was dead. The others were safely transported to Mahiwa and are doing well. A heifer calf was born prematurely on 16th December, 1947, and is doing well. The mother has made a good recovery.

BUILDINGS

A cattle byre and two-roomed dairy were completed during the year. Other buildings constructed were a herdsman's house and thirteen labourers' houses. The office and stores buildings were completed. In addition, the labour constructing a battery of ten grain bins for Tanganyika Railways was supervised. These bins, with a total capacity of a hundred tons, will become the property of this department when no longer required by the Railways.

The foundations of the rest camp, despite buttressing, continued to give trouble and it was necessary to demolish the tops of the heavy Dutch type gables and replace them with a thatched hipped roof.

The rat proof grain store has been very satisfactory.

ACKNOWLEDGMENTS

The co operation of all government officers in the province is gratefully acknowledged.

A. S. Stenhouse,
Senior Agricultural Officer,
Southern Province

RAINFALL IN INCHES AND RAIN-DAYS DURING SEASON 1946-47

	1946					1947							
	August	September	October	November	December	January	February	March	April	May	June	July	Total
Lindi ...	—	1·37 (11)	0·67 (4)	0·80 (2)	7·47 (15)	7·42 (13)	4·51 (14)	4·78 (14)	7·05 (21)	1·19 (6)	0·14 (2)	0·14 (2)	34·54 (104)
Average ...	0·23	0·48	0·63	1·63	5·42	5·71	5·24	7·37	5·91	1·57	0·46	0·26	34·52
Masasi ...	—	—	0·77 (3)	0·20 (3)	4·29 (13)	11·19 (14)	12·15 (14)	10·17 (18)	5·04 (20)	—	—	—	44·31 (85)
Average ...	0·07	0·74	0·41	1·50	4·51	7·03	8·67	8·25	4·36	0·81	0·01	0·01	36·07
Newala ...	0·04 (1)	0·71 (3)	0·12 (2)	2·76 (10)	8·42 (9)	10·28 (16)	4·57 (13)	7·28 (16)	4·22 (14)	4·45 (7)	0·39 (4)	—	42·24 (95)
Average ...	0·04	0·10	0·20	0·99	7·67	10·16	7·95	7·20	3·06	1·29	0·20	0·06	39·03
Mikindani ...	0·04 (1)	1·91 (9)	0·03 (1)	0·16 (5)	5·43 (10)	0·08 (7)	4·06 (10)	7·28 (18)	9·49 (14)	2·44 (5)	0·08 (1)	—	39·00 (81)
Average ...	0·25	0·50	0·44	1·46	5·79	7·16	4·78	5·75	6·06	1·79	0·52	—	34·50
Kilwa ...	—	—	1·46 (2)	2·37 (4)	3·51 (12)	11·15 (8)	3·31 (10)	6·11 (13)	4·42 (6)	4·74 (7)	0·08 (1)	—	37·15 (63)
Average ...	0·45	0·76	0·78	1·86	4·41	5·21	4·26	7·05	8·42	2·67	0·53	0·32	37·72
Tunduru ...	—	0·39 (2)	0·07 (1)	4·25 (5)	6·26 (15)	10·26 (20)	14·35 (22)	21·23 (27)	4·58 (17)	1·05 (8)	0·14 (2)	—	62·58 (119)
Average ...	0·06	0·12	0·18	1·11	7·16	11·21	10·09	6·31	3·40	0·51	0·14	0·04	40·33

NOTE.—The figures in parentheses denote the number of days of rain during the month.

Annexure 2 (Southern Province Report)

PRINCIPAL AGRICULTURAL EXPORTS (IN TONS) FROM THE PORTS OF LINDI, MIKINDANI AND KILWA

	1943	1944	1945	1946	1947	Value
						Shs. Cts.
Sisal	13,359	13,165	11,139	9,817	9,074	10,098,554 00
Cashewnuts	269	355	3,971	1,900	1,312	432,996 00
Sesame	5,162	2,654	3,223	2,976	3,344	1,265,616 13
Groundnuts	1,402	954	1,756	373	991	407,750 84
Mangrove Bark	1,620	1,575	3,455	1,258	3,548	600,980 00
Pulses	521	339	858	53	4,976	1,366,497 23
Wild Rubber	121	64	118	45	–	–
Copra	684	809	699	635	625	234,911 51
Beeswax	151	113	45	331	51	314,096 61
Colombo Root	67	192	346	85	96	47,637 00
Mtama	4,265	2,003	1,029	117	4,253	784,097 65
Tobacco	170	178	130	185	126	103,724 56
Gum Copal	79	163	113	196	61	76,159 47
Other Grain	90	84	370	41	13	5,890 00
Millet	–	–	–	122	769	316,061 95
Cotton	183	132	128	48	31	35,586 01
Native Starch	257	253	106	100	12	4,306 00
Cassava	4,144	7,957	261	1,870	2,244	458,931 02
Maize	1,759	1,505	48	10	1,932	359,527 31
					Total Shs. ...	16,913,323 29

Annexure 3 (Southern Province Report)

SEED COTTON PURCHASES (IN KILOGRAMS) 1947-48 SEASON

District	Quantity "A" Quality	Quantity "C" Quality	Value
			Shs. Cts.
Lindi	17,500 ...	1,313 ...	7,056 44
Masasi	12,445 ...	692 ...	4,732 30
Tunduru	31,762 ...	– ...	10,640 75
Mikindani	31,332 ...	4,688 ...	13,156 52
Total ...	93,039 ...	6,693 ...	35,586 01

PROVINCIAL ANNUAL REPORTS 1947—(*contd.*)

Northern Province

STAFF

The following officers were stationed in the Northern Province during the ye a 1947:—

Moshi.—Mr. J. V. R. Brown, Senior Agricultural Officer.

Mr. R. J. M. Swynnerton, M.C., Agricultural Officer, 1st January, 1947, to 21st June, 1947.

Mr. H. L. Brett, Agricultural Officer, 29th May, 1947, to 31st December, 1947.

Mr. J. S. Gunn, Agricultural Officer, 1st January, 1947, to 23rd January, 1947.

Mr. E. Hall, Agricultural Assistant, 1st December, 1947, to 31st December, 1947.

Arusha.—Mr. T. C. Cairns, Agricultural Officer, 1st January, 1947, to 7th March, 1947.

Mr. J. K. Robertson, Agricultural Officer, 3rd March, 1947, to 31st December, 1947.

Mbulu.—Mr. H. L. Brett, Agricultural Officer, 1st January, 1947, to 6th May, 1947.

Mr. J. S. Gunn, Agricultural Officer, 26th April, 1947, to 31st December, 1947.

Temporary staff postings were as undernoted:—

Arusha.—Mr. H. A. Wilkin, Crop Supervisor, 1st January, 1947, to 30th September, 1947. (Appointed Executive Officer, Arusha Production Committee, 1st October, 1947.)

Mr. P. J. van Emmenes, Crop Supervisor, 1st January, 1947, to 31st July, 1947.

Mbulu.—Mr. A. S. de Beer, Temporary Agricultural Assistant, 1st January, 1947, to 31st December, 1947.

The disposition of the African agricultural instructor staff, excluding Native Administration instructors, was follows:—

	Local Civil Service	Food Production Staff	Total
Moshi	19	26	45
Arusha	11	9	20
Mbulu	11	12	23
	41	47	88

WEATHER

Extracts from district reports give a general indication of the weather conditions experienced throughout the province:—

Arusha.—The rainfall was higher than the average for the past twenty-four years = 48·98. Although the heavy rain benefited most crops it was too heavy for successful wheat cultivation especially as most wheat growers had planted early in anticipation of light rains as had been experienced for several years. Seed-bean growers likewise planted early and the heavy rains enabled disease to spread among stocks of seed beans. The heavy rains were a boon to the coffee industry and the coffee crop was increased as a result; also the coffee trees at the end of the year are in better condition than they have been for some considerable time, and prospects for a good coffee yield in 1948 are good.

Moshi.—Excellent rains were experienced throughout the Moshi District during the 1947 planting and growing season; they were, however, somewhat too prolonged and the showery weather in August and September tended to interfere with the harvesting and ripening of the wheat and maize crops; moist and dull conditions during these two months invited attack by plant diseases particularly wheat rusts of which there was a high incidence on certain farms.

The short rains which normally fall in October and November were extremely localized and only in the extreme north-west of the district were they of any consequence; in the remainder of the district they failed to materialize.

Mbulu.—After two years of drought and resultant famine Mbulu District was favoured by excellent rains in 1947, as is true of most areas throughout the Territory. After rather a shaky start to the rains heavy rain fell in April and May and continued into June. Fortunately the dry periods in January, February and March were never sufficiently prolonged to cause the crops to die back. Rain was, in fact, excessive in the Karatu area where the wheat crop suffered severely from rust as a result. The short rains in 1947 began late in November and continued right through December, the December 1947 rainfall being one of the highest on record for that month in Mbulu. Cloudy conditions are persisting and at present there is every prospect of good rains and a good harvest in 1948—but conjecture about the weather is dangerous.

	Moshi	Average (37 years)	Arusha	Average (25 years)	Mbulu	Average (28 years)
October	4·66	1·02	2·92	1·43	1·75	0·72
November	0·26	2·54	0·52	4·74	1·76	3·32
December	2·09	2·12	5·96	3·58	3·08	4·50
January	2·58	1·35	3·35	2·26	4·73	4·00
February	1·32	1·97	2·88	3·50	2·75	3·35
March	4·35	4·54	5·15	7·36	4·84	5·94
April	17·34	13·80	22·61	13·58	10·04	6·41
May	8·08	9·13	15·50	8·15	3·81	2·49
June	4·35	1·49	3·01	1·33	0·94	0·18
July	0·10	0·99	0·52	0·48	0·00	0·03
August	0·49	0·72	0·24	0·87	0·00	0·08
September	0·72	0·73	0·65	0·90	0·13	0·20
	46·34	40·40	63·31	48·18	33·83	31·22

GENERAL CROP PRODUCTION

Although the year 1947 was blessed with ample rains and a precipitation above average it did not produce the record crop yields which one might have been led to expect from a glance at the rainfall figures.

While it is true that a record surplus of maize was produced the actual output would have been exceeded had the rains tailed off in May as is generally the case; continuous rain in April and May made weeding difficult and induced spindly growth with consequent light yields. These heavy rains combined with overcast conditions were also unfavourable to successful wheat, bean and pawpaw cultivation and, in fact, the only crop which can be said to have benefited from the moist conditions was coffee.

FOOD SUPPLIES

Arusha District.—The position regarding food supplies the shortage of which was acute in certain areas of the district during 1946 tended to improve towards the end of that year and was much alleviated in early 1947 by a successful short rains maize crop harvested in the period January to March. By the time an equally successful main rains crop has come on to the market the shortage had passed and thereafter supplies were available in ample quantity.

Moshi District.—It will be recollected that the food position had deteriorated in 1947 following upon two bad seasons of rainfall and that the yield of bananas, the staple diet of the Wachagga, had declined seriously; as a result, however, of the excellent rains in the latter part of 1946 and the first half of 1947 the position was restored and further safeguarded by a good maize harvest.

Mbulu District.—The Agricultural Officer writes: "Since the harvesting of the early crops in April and May, there has been no cause for anxiety about food supplies in the district. The harvest was an excellent one, both from the point of view of yield and of acreages planted. Owing to the food shortage at the end of 1946 and early 1947 many people were somewhat weak and ill able to resist attacks of malaria, the incidence of which was very severe throughout the district during May, June and July. The building of fourteen grain silos at various points throughout the district began in October and several have now been completed while others are in course of erection. Filling of the ones in Mbugwe has begun by compulsory contribution of grain by every taxpayer which procedure will be followed throughout the district. Once all silos are filled a most valuable safeguard against famine will be secured."

LABOUR

The most important change in labour matters during the year has been the formation of the Northern Province Labour Utilization Board in place of the previous Labour Allocation Board. A cess at the rate of one shilling per labourer per month was levied but this was found to be insufficient to meet the board's expenses and was increased to one shilling fifty cents per head per month later. Although there has been some criticism of the board locally, especially when demands for labour cannot be met at short notice, it is very obvious that greater numbers of labourers are now coming forward than previously. Most large scale employers of labour are wholly in favour of the scheme and it is obvious to more reasoned opinion that the formation of the board and its successful continuance should go a long way towards solving the labour problem in the Northern Province.

CROP PRODUCTION IN DETAILS

Coffee

Plantation Coffee.—After the very poor crop obtained last season it is gratifying to record that the 1947/48 season was a bumper one as far as quantity was concerned, the trees on most estates throughout the province setting one of the heaviest crops on record. The heavy rains of 1947 not only enabled a good crop to be picked but the coffee trees at the end of the season were in much better condition than they had been for several years. As a result of drought conditions experienced in 1946 many of the trees were in such poor condition that they could not ripen all the crop they carried; in addition, many estates had difficulty in securing pickers and as a consequence of these two factors the percentage of buni was greater than usual.

Quality was disappointing and although it improved towards the middle of the season it fell off again during the last four months. Classification results indicate that the standard is above that of last season.

With regard to the export figures which will be given later on in this report it should be noted that these do not give a true comparison with previous years as a not inconsiderable acreage of coffee has recently been uprooted and replaced by pawpaw.

As previously mentioned, the condition of the trees at the end of the year was good, particularly in the Arusha area where frequent showers during the hot season prevented temperatures ever remaining high enough to provide favourable conditions for thrips multiplication; conditions were not so favourable in the Moshi District where hot dry conditions prevailing towards the end of the season encouraged thrips attack; the incidence of this pest, however, was less than anticipated.

In areas where the trees have not been set back severely by die-back as a result of over-bearing or by *Hemileia*, flowerings have been satisfactory and a normal average crop may be expected next season provided the rains are satisfactory.

Native Coffee : Kilimanjaro.—The 1947/48 crop is likely to prove a record with an estimated production of 4,300 tons parchment, the previous record being 4,065 tons in the season 1940/41. At the end of February, 1948, 3,636 tons parchment had been delivered to the Moshi curing works and it was estimated that some 600 to 700 tons had still to come in.

The quality and size of this year's bean appeared to depend largely on the elevation at which the coffee was grown and on weather conditions; the lower levels where the crop is earlier produced a good sized bean of good quality, while the middle and higher areas, where picking is later, gave a smaller bean of lower quality—this was possibly due to the failure of the short rains which otherwise would, in all probability, have given just that extra fillip to the bean in the matter of size and quality. It follows, therefore, that early deliveries were of good quality; this, however, deteriorated very considerably as the season advanced and it is expected that the standard will be only slightly above that of last season, which was poor.

The crop was fairly free from the usual pests and diseases; an outbreak of thrips, which at one time appeared imminent, fortunately did not materialize.

The value of the crop, at an average price of say £140 per ton f.o.b., will amount to some £480,000.

Flowering has been good and if normal rains are experienced in 1948 a good average crop may be anticipated.

Native Coffee : Arusha.—Although there has been no marked extension of coffee growing in the Arusha area during the year there has been steady improvement in the preparation of the saleable coffee and in the manner of looking after trees in the field.

Sales were held in December and February and the crop is reported to be one of the best secured in the district since coffee growing commenced. Quality was above that of the previous year.

The following table shows total exports of coffee (native and non-native), expressed as tons of parchment, from the Northern Province coffee-growing areas during the past five years:—

	1943	1944/45	1945/46	1946/47	1947/48
Native					
Arusha-Mbulu	73	198	94	161	194
Moshi	2,506	3,886	3,102	2,318	4,271
	2,579	4,084	3,196	2,479	4,465
Non-Native					
Arusha-Mbulu	1,258	1,531	1,441	678	1,265
Moshi	988	1,027	1,551	149	1,370
Total ...	4,825	6,642	6,188	3,306	7,100

Moshi Native Coffee Board.—There is little need to enlarge upon the activities of this board as it publishes its own annual report—the 1946/47 report having but recently been published and widely distributed. In so far as it affects this department, however, a few comments may be appropriate:—

(a) *Propagating Centres.*—Planting of trial plots and mother trees was carried out on Msinga Estate and Lyamungu. Clearing was undertaken at Kirua-Vunjo for the purpose of planting a trial plot and mother trees there. Shortage of clonal planting material is likely to retard the progress of these centres. The centre at Haruma was abandoned as being considered unsuitable—very great outlay being required to

pipe water to the site. The centre at Usseri will probably have to be abandoned as it has been discovered that rock lay very close to the surface and the depth of soil was inadequate for coffee growing. This will leave Rombo without a centre, as negotiations for a plot at Mrao failed. If this scheme is to be of value to the coffee industry of the Wachagga only the most suitable areas should be used.

(b) *Coffee School.*—Buildings are ready for occupation except for water and lighting. Teaching staff have yet to be obtained and a syllabus drafted.

Tanganyika Coffee Curing Company Limited.—This company was formed in July 1947, the two shareholders being the Tanganyika Coffee Growers' Association Limited, and the Moshi Native Coffee Board, each of whom holds an equal number of shares. The original intention had been to build an entirely new curing works to be ready for the 1948 49 crop and capable of dealing with the maximum anticipated mild coffee production of the Territory, some 8,000 tons. Very high building costs as reflected in the tenders submitted made it necessary to abandon this project and to investigate the possibility of purchasing the present works, which are on lease, and effecting extensive alterations, additions and improvements.

Additions and improvements carried out during the year to the existent plant enabled the company to process the whole of this season's large crop, and it is worthy of note that a record output of 1,327 tons was achieved in January 1948.

Wheat

As indicated earlier in this report the main rains of 1947 were too heavy and too protracted for successful wheat growing particularly in regard to varieties susceptible to leaf rust.

Prior to 1947 there had been a succession of dry years during which the early plantings had given the highest yields and in the absence of any reliable forecast of heavy rains in 1947 wheat growers again planted early. The humid conditions prevailing as a result of heavy rainfall in April and May enabled leaf rust to spread and much of the wheat throughout the province did not form any grain in the ears and large areas were not considered worth harvesting. The success of this year's wheat crop depended to a large extent, therefore, on the variety or varieties chosen by the growers; for example, "Kenya Governor" which is less susceptible to leaf rust than most varieties gave a moderate return while "192", a highly susceptible variety, was almost a complete failure.

In this connection, the Agricultural Officer, Arusha, writes: "The most promising advance in Northern Province wheat growing is to be found in the introduction of the newer hybrids from the plant breeding station at Njoro, Kenya, and it is gratifying to record that several varieties show considerable promise. Two of the best seen were 261 (R. 7. C. 1. B) and 261 (S. 10. C. 2. D); both are highly resistant to stem rust and leaf rust and gave good yields in 1947 where other varieties failed completely. They are also "hard" wheats, valued by the mills for blending purposes. Four strains of "294" wheats were also successful although not prized so highly as the "261" strains.

Crop progress in the various districts is briefly described in the succeeding paragraphs:—

Arusha.—While the opening up of new land in the Ol Joro area increased the acreage under plantation wheat this was offset to some extent by the abandonment of wheat land where crop failure had been experienced in 1946.

Yields varied very considerably according to the rust resistance of the variety grown and in general the results were disappointing.

With regard to native grown wheat, which is mainly produced on the drier western slopes of mount Meru, the acreage sown in 1947 was roughly one-third of that of previous years; this was largely due to the attractive maize price which induced many growers to change over to the latter crop.

Moshi.—The acreage under non-native grown wheat in the Ngare-Nairobi area also showed an increase but this was not reflected in the production figures, as yields were below average on account of disease.

Production by natives of the Kibongoto area dropped very considerably owing to a decrease in acreage due to a switch over to maize, and losses caused by a high incidence of leaf rust.

Mbulu.—Excessive rain and heavy rust attack caused severe losses to Oldeani farmers particularly to their early planted wheat; much of their later planted crop escaped damage, however, and gave a fair yield.

Native grown wheat suffered heavily from rust attack and yields were disappointing amounting to complete crop failure in many cases. Wheat growing on a comparatively large scale by natives of the Karatu area was further extended during the year.

The non-native crop was sold through the agency of the Kenya Farmers' Association with the Northern Province Farmers' Co-operative Society acting as sub-agent. The guaranteed price was the same as last year, i.e. Shs. 27/50 per bag of 200lb. of first grade quality.

The native crop was marketed by the Kenya Farmers' Association who purchased at prices ranging from Shs. 22/50 to Shs. 27/50 per bag according to quality and distance from railhead.

Sales (in tons) over the past five years are as undernoted:—

	1943	1944	1945	1946	1947
Non-Native					
Arusha-Mbulu	2,033	3,216	2,067	2,277	1,312
Moshi	298	658	482	477	673
	2,331	3,874	2,549	2,754	1,985
Native					
Arusha ...	448	642	387	112	129
Mbulu ...	224	136	343	–	142
Moshi	219	49	9	20	3
	3,222	4,701	3,288	2,886	2,259

Northern Province Wheat Scheme.—Once again unfavourable weather conditions affected production particularly on the wheat scheme farms on the Ardai Plains where the crop was largely a failure mainly due to leaf rust. The early planted wheat suffered most severely and large areas were considered not to be worth harvesting. Later plantings, although attacked by leaf rust, were not so badly damaged and yielded small returns.

In the Mbulumbulu and Ngare-Nairobi areas, where lower rainfall was experienced, crops were less attacked by disease and yields were higher.

The heavy rains throughout the above-mentioned areas not only brought on conditions suitable for disease but also interfered with planting and other field operations.

The total production amounted to 24,938 bags, obtained from 16,619 acres of which only 10,228 acres were harvested.

The average yield per acre was 1·50 bags as against 2·58 bags in 1946, 3·41 in 1945 and 2·15 in 1944. The three areas operated by the wheat scheme gave the following results:—

	Total Crop Bags	Acres Sown	Acres Harvested	Average Yield 1944	1945	1946	1947
Ardai	1,148	9,947	3,207	1·45	2·89	0·88	0·36
Mbulumbulu	12,870	3,681	3,681	3·38	4·71	9·88	3·50
Ngare Nairobi	10,920	2,991	*3,340	3·88	4·33	4·51	3·27

*Includes volunteer crop from 625 acres.

Maize

Weather conditions in 1947 favoured the maize planter and, as anticipated, a record crop was harvested which would have been even heavier had early planting been the rule.

The early and unseasonable rains in January and February—taken advantage of by one farmer in the Moshi District who planted in January and got away with it successfully—were a mixed blessing as they held up mechanical cultivation in some areas and made it difficult to work the land.

The early planted maize gave some excellent yields but later plantings were inclined to be tall and spindly with undeveloped cobs and consequent light yields. Some of the maize in the Arusha area was damaged by army worm and although replanting was carried out much of this replanted maize was too late to get fully established before the onset of the cold weather.

Both native and non-native crops in the Mbulu District were well above average and the Mbulu native for once in a while reaped a good harvest.

Mechanical maize pickers purchased by two estates in the Arusha District gave good results and attracted considerable interest particularly in view of the saving of labour at the time of year when labour shortage is felt most acutely.

Besides being handicapped by shortage of labour, the industry was also hampered by a serious shortage of storage space and to a certain extent by a scarcity of gunny bags.

Sales of surplus maize in bags during the year to the Control are given below:—

District	Non-Native	Native	Total
Moshi	48,983	31,537	80,520
Arusha	29,589	14,345	43,934
	78,572	45,882	124,454

The previous production was 102,001 bags in 1945. Compared with the production achieved in that year, the 1947 figures show that the Moshi non-native output decreased by 18 per cent while Arusha non-native production increased by 81 per cent. Moshi natives increased their output by 48 per cent and Arusha natives showed a spectacular increase of 215 per cent.

Pyrethrum

Pyrethrum exports during the year amounted to just over 203 tons valued at £22,828. This is some 105 tons less than was exported in 1946, the decrease being largely due to the voluntary curtailment of production.

The marketing of the Northern Province crop is still carried out by the Kenya Farmers' Association, all pyrethrum flowers being railed to Nakuru for baling.

Papain

The steady increase in the price of papain during 1946 and the first few months of 1947 was accompanied by a similar increase in the acreage under pawpaw and the demand for suitable pawpaw land was consequently considerable. Prices rose from Shs. 27/- per lb. in January to Shs. 31/- in April but market conditions then became

uncertain and in June prices had dropped to Shs. 20/- and at the end of the year to Shs. 17/- per lb.

The heavy rainfall of 1947 and the lack of sunshine and dull overcast conditions following the rains severely affected pawpaw trees throughout the province and caused a marked decrease in yields. Growth was seriously retarded and trees with tapered stems, reduced foliage and shortened internodes were common; there was no evidence that the condition was caused by an organism and the fact that the trees improved with the warmer weather in November and December points to the weather as being the cause of the trouble. Exports amounted to 108 tons valued at £298,197.

Discussions took place during the year regarding the standardization and improvement of papain and the possibility of introducing legislation to eliminate adulteration and one notable advance in this direction was the formation, towards the end of the year, of the Tanganyika Pawpaw Growers' Association.

Sisal

The following table shows the export tonnage of sisal from the Northern Province during the past five years :—

District	1943	1944	1945	1946	1947
Arusha ...	2,640	2,191	2,649	2,506	2,714
Moshi ...	1,738	2,669	2,875	3,380	2,053
	4,378	4,860	5,524	5,886	4,767

Sugar

Production at the Tanganyika Planting Company's Arusha Chini estate in the Moshi District amounted to 7,202 tons of refined sugar and 304 tons of unrefined sugar, a total of 7,506 tons. Production was less than last year by 144 tons.

The company's two main problems in the field—

(a) *Cochliotis melolonthoides*, a pest of sugar cane; and

(b) salt concentration in the soil,

are still under investigation.

Seed Beans

Although there was a marked increase in the acreage planted to seed beans in 1947 this increase was not reflected in the quantity exported owing to disappointing yields and a higher proportion than usual of rejected beans brought about by a high incidence of disease following heavy prolonged rains. Exports amounted to 560 tons valued at some £25,470.

At the end of the year about one-fifth of the crop was still in the hands of the producers. A further increase in acreage under this crop is anticipated in 1948.

Beans

A good short rains crop was obtained in the Arusha area but otherwise the crop was poor on account of unfavourable weather conditions. A surplus of 620 tons of mixed beans and 33 tons of white haricot beans was purchased by the Control. Mixed beans were decontrolled at the beginning of November.

Cotton

Purchases of native grown seed cotton by districts and cash payments to growers during the season were as undernoted :—

	Purchase in Kilograms.			
District	"A" Quality	"C" Quality	Total	Cash Payments
Moshi	152,396	34,291	186,687	67,873/52
Arusha	2,334	493	2,827	1,035/15
Mbulu	10,273	8,604	18,877	4,953/91
	165,003	43,388	208,391	73,862/58

The following table shows the figures of native cotton production for the past five seasons :—

Total Cotton Purchases in Tons.

District	1943/44	1944/45	1945/46	1946/47	1947/48
Moshi	110	95	107	153·6	186·7
Arisha	43	33	13	8·8	2·8
Mbulu	35	nil	32	24·6	18·8
	188	128	152	187·0	208·3

Although 1947 was quite a good year for cotton, some of the production areas in the Moshi and Arusha districts were inundated by flood water and by the time this had subsided it was too late to plant.

The Mbugwe-Magugu area of the Mbulu District produced a good crop but a considerable proportion of it was left unpicked in the field.

Onions

A moderately good crop was obtained throughout the province, quality being up to average. Damage by thrips was not severe and disease—principally neck rot—was observed in Mbulu only.

Prices were steadier this season ranging from Shs. 4/50 to Shs. 8/- per frasila with an average of approximately Shs. 7/- per frasila at which figure the value of the crop represented a return to the growers of some £43,800.

Exports (in tons) from the province during the past five years are as undernoted :—

District	1943/44	1944/45	1945/46	1946/47	1947/48
Moshi	1,574	1,156	875	740	991½
Arusha–Mbulu... ...	854	764	1,325	943	967½
	2,428	1,920	2,200	1,683	1,959

Onion Seed Production : Mbulu.—The season was even worse than that of 1946 from the point of view of seed production and as a result the scheme has been abandoned. The quantity of seed produced amounted to 252lb., the main factor contributing to the poor yield being the fungus *Botrytis allii* which causes neck rot. This disease seriously affected the crop and in some plots almost every plant died off without producing seed. Thrips also was present but was not serious at the time of the main crop.

Potatoes

These were in short supply during 1947, blight being responsible for poor yields in the Kilimanjaro area, the main producing centre. Ninety-three tons were marketed, mainly from the Rongai region ; marketing returns would be higher were it possible to control the export of produce from this area into Kenya. Potato riddles will be placed at Rongai in time for the coming crop so that grading for seed can be carried out.

Root Crops

The cultivation of sweet potatoes and cassava was encouraged with a view to providing a more varied diet and as an anti-famine measure.

Eleusine

Excellent crops were obtained in the Moshi District, particularly in Rombo, during the long rains. Samples of eleusine varieties secured from neighbouring territories were tried out and while some matured earlier than others none has yet been tested for drought resistance owing to the prolonged rains.

Rice

A good but comparatively small rice crop was secured in the Rau area of the Moshi District, and in the Magugu-Magara area of Mbulu; the tonnage which came into the hands of the authorized purchasing agents was small, however, the bulk of the crop disappearing into the black market.

EXPERIMENTAL WORK

The results of various experiments conducted by the Agricultural Officer, Moshi District, are described by him as follows:—

"*Onions.*—A number of experiments were carried out mainly in relation to the use of sulphate of ammonia for increase of yield; rate and time of application combined with spacing for planting. Some significant results were obtained. Analysis of all the experiments are not yet complete and publication of all the results together will be made when all are complete. A trial with some seed brought from America—Texas Grano—which is claimed to be resistant to onion thrips was made, but the results were not very satisfactory. Although a crop was reaped this onion appears to be a poor 'keeper'."

"*Regrassing of Moshi Aerodrome.*—Some trials of grasses on a portion of the aerodrome were undertaken but the results are not of great value. Only one grass—'Uru' grass— a fine strain of *Cynodon dactylon* proved satisfactory in habit, but this has yet to prove itself sufficiently drought resistant and to resist the ingress of other tougher grasses. All the remainder, on being mown, left sharp stumps quite unsuitable for the landing of aircraft."

"*Regeneration : Rombo.*—Some trials in regeneration of over-grazed, eroded land in Rombo were carried out. One effect of over-grazing is the extinction of most of the grass and the growth of dense short scrub. A piece of land was cleared of scrub and narrow-base contour ridges constructed; this was undoubtedly successful as there was a good regeneration of grass on this plot after one year of being prepared. Unfortunately the sight of grass was too great a temptation to some Warombo who opened the dry thorn hedge and turned cattle into it. A further area was cleared in July 1947 and selective weeding is to be tried on a part of this and some introduced indigenous pasture grasses on another part. Trials of hedge-plants for contour ridges will also be carried out and preparations are already in hand for planting in the next *masika*."

SETTLEMENT

The question of land for non-native and native settlement in the Arusha and Moshi districts is dealt with in the report of the Arusha-Moshi Lands Commission published during the year.

With regard to the native settlement scheme at Mbulumbulu in the Mbulu District, this has progressed satisfactorily during the year and will increase considerably that additional land, formerly farmed by the Northern Province wheat scheme, has become available.

The Agricultural Officer, Mbulu, writes as follows in respect of non-native short-term leases and settlement in that district:—

"(a) After much delay the short term rights of occupancy for wheat production in the Marera, Kilima Tembo area, in the north of the district, have been approved for a period of three years, and all but two of the original applicants have taken up these leases. These two leases have been allocated to other farmers.

"(b) The alienation of farms in the Dudumera valley on long term leases has now been approved and 1948 should see the land allocated to some of the applicants.

"(c) At the end of the year the first six units at Oldeani were given out to six applicants and thus the beginning of a new settler community there has been started which will grow as the remaining units at present farmed by the Custodian of Enemy Property are allocated to farmers later in 1948."

Progress, as described in the district reports, has been as follows:—

"*Moshi.*—Routine measures have been carried out by gangs of levellers stationed round the mountain. This comprises maintenance of previously constructed ridges and marking out levels in newly-opened areas such as the forest strip and the lower areas. A concentration of twenty-four levellers was made in Rombo prior to the short rains to mark out levels in newly-opened areas and to improve existing work. Strong support to this work is given by most Mangis, who impose severe fines on those who do not carry out the work.

"*Arusha.*—A start has been made during the past year to demarcate the uppermost limits of cultivation on steep hills and as the requisite legislation has now been passed it should be possible from now on to stop the progressive upward extension of cultivation with the resultant destruction of the forest cover. To date only two hills have been so demarcated (Kihutu and Kibwezi) since it was deemed advisable to have all necessary legislation passed before the work was actually begun. In addition to the demarcation of hill tops the closing of cultivation on or near certain very steep places, e.g. river banks, ravines, water courses, etc., has also been agreed to and no further cultivation will be allowed after the present crops have been reaped.

"*Mbulu.*—The work of laying out contour banks in native shambas has continued since harvesting was completed. Generally the attitude of the people continues to be apathetic, and the work is done within the letter of the rules rather than in the spirit of them and without an understanding of their necessity. A notable exception to this is in Dareda where an excellent response has been made, thanks chiefly to the energetic sub-chief there who is a good cultivator himself and conscious of the need for protecting the soil.

"In Karatu an attempt has been made to control soil erosion in native wheat fields where ox cultivation is practised. Grass strips have been measured on the contour and will be left uncultivated this coming year. As these strips are fairly close together and wide it is hoped that fairly effective control of soil wash may be obtained. Two peasants have elected to terrace their land rather than lose some of their arable area under grass strips. During the coming year considerable advances in soil conservation are hoped for as the rehabilitation scheme gets under way."

DEVELOPMENT

Development projects in the Moshi and Mbulu districts are dealt with in the following extracts from district reports:—

"*Moshi.*—Numerous projects mainly concerned with the organized expansion of the Wachagga have been in existence since pre-war days and these have been revised during last year with a view to bringing them up to date in the light of changed conditions. The publication of the report of the Wilson Lands Commission has led to the formation of a select committee which has already submitted its recommendations to Government. The decision of Government will, of course, affect the planning of development in as much as the land allocated for native expansion and for European settlement is not yet definitely known. Nevertheless in the case of certain farms the Land Settlement Officer has been instructed to plan economic units with a view to European settlement. He is now engaged on this task. That, briefly, describes the situation in regard to European development. Plans for native development are rather more complex. The simple idea behind the planning is to provide the main essentials—e.g. water, freedom from tsetse fly, administrative and social services—in the lower areas with a view to settlement to relieve the congestion on the higher fan-slopes of the mountain. Superimposed upon this plan is one for the establishment of ploughing or grain-producing units on land suitable for mechanical cultivation below the Arusha-Taveta road. There is a plan to improve existing Chagga furrows with a view to prevent wastage of water and to get it further down towards the expansion area. Money (£2,000) was provided from Development Funds for the purpose of providing cement and skilled labour while the contribution

of the Native Authority was to have been unskilled labour and the provision of sand and stone without cost. Although taken to the highest level it was found impossible to procure any cement for this project in 1947. A revote has therefore been asked for in the hope that work can be commenced in 1948. Funds were allocated for the purpose of soil conservation and rehabilitation in the Eastern sector—Mwika to Usseri. Only routine measures and a little investigational work have been carried out so far as some detailed surveying work is required over the whole area concerned and a European is necessary to undertake this. The mechanical production plans will probably be held up on account of the difficulty of obtaining machinery. The larger expansion schemes are held up on account of major difficulties of water problems and tsetse fly. European staff is likely to be available shortly but the utilization of these to the best advantage in the district will be restricted by lack of accommodation and an almost total lack of transport of this department in the district.

"*Mbulu.*—The plans and allocation of money from Colonial Development and Welfare Funds for the development of Mbulu District were approved by the Secretary of State in the second half of the year and since September two Development Officers and one Field Officer have been appointed to the district. So far the work has been largely preparatory—house building, collection of instruments and materials, etc., but it is hoped to begin initial surveys and field work early in 1948. The whole district staff works as a team and co-operation between all departments and the Development Staff is essential to the success of the plan."

VERMIN DESTRUCTION

Some poisoning of baboons, monkeys and moles was carried out in areas of the Moshi District where crops were being damaged. The allocation of funds from the Native Treasury for payment of personnel for this work has been cancelled for 1948 so that it was necessary to retrench six men at the end of the year.

PESTS AND DISEASES

Desert Locust.—The province was free from locusts during the year.

Coffee.—Sanitation measures against white stem-borer and *Antestia* were carried on during the year. Thrips attack was not serious. In the Moshi District, leaf-miner was severe and *Hemileia* caused considerable defoliation of trees in some areas.

Maize.—Stalk-borer and cut-worm damage occurred during the season but was no worse than usual.

Wheat.—The crop was badly affected by leaf and stem rusts particularly the former. Glume blotch (*Septoria nodorum*) was also present.

Onions.—Thrips was not very prominent during the season. Neck rot was one of the principal diseases in the Mbulu area and caused considerable damage.

Bananas.—Extensive propaganda was carried out against the banana weevil in the Moshi area where it was first observed in 1946.

Beans.—Anthracnose, bacterial blight, angular spot and mosaic were observed on beans in the Arusha District.

MISCELLANEOUS

His Excellency the Governor was pleased to award the King's Certificate of Honour and Badge to Senior Instructor Gabriel Haygaru, Mbulu District.

Production Committees.—Both committees functioned throughout the year—the sixth since their inception. The Arusha committee met on thirteen occasions and the Moshi committee on fourteen occasions and five joint committee meetings were held during the year.

Savings Bank.—The Moshi instructor staff collected the sum of Shs. 5,368/- in savings during 1947, bringing the total subscribed since July 1944 to Shs. 16,188/-.

J. V. R. Brown,
Senior Agricultural Officer,
Northern Province

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Tanga Province

STAFF

There were several changes in staff during the year, the most important being the posting of a responsible officer to the Pare District. Mr. C. J. McGregor, Senior Agricultural Officer, assumed charge of the agricultural affairs of the province on the departure on leave of Mr. R. D. Linton, Senior Agricultural Officer, on 4th March, 1947. The Senior Agricultural Officer was stationed at Lushoto throughout the year.

The details of staff postings and changes were as follows:—

The Tanga and Pangani Districts.—Mr. Doggett, Agricultural Officer, was in charge during the whole of the year.

Mr. G. Hilditch, Crop Supervisor, served until 31st January, 1947, when he resigned.

Mr. B. S. M. Host, Temporary Agricultural Assistant, arrived in January, 1947, but his appointment was terminated and he departed on 30th April, 1947.

Mr. van Somerin Greve, Crop Supervisor, was appointed on 1st November, 1947, and continues to serve.

The Pare District.—Mr. J. S. Gunn, Agricultural Officer, arrived on temporary transfer in January and remained until 24th April. He was relieved by Mr. T. Jarrett, Agricultural Assistant, who later resigned and departed at the end of November being replaced by Mr. G. H. McGavin, Agricultural Assistant, who arrived on 26th November.

The Korogwe Division.—Mr. T. Jarrett, Agricultural Assistant, served in the area from 16th January until 23rd April when he was transferred to the Pare District.

The Handeni Division.—Mr. L. Leslie-Moore, Senior Agricultural Assistant, was stationed in Handeni during the year except for the period 20th June to 14th September when he was on leave.

Mlalo Rehabilitation Scheme.—Mr. J. B. Clegg, Agricultural Officer, continued to be stationed at Malindi, Lushoto, in charge of the scheme throughout the year.

Lushoto Division.—Mr. T. J. Taverner, Agricultural Assistant, has been stationed in Lushoto throughout the year. He has worked mostly on the Luengera irrigation project but assisted the Senior Agricultural Officer with the agriculture of the Korogwe and Lushoto divisions.

A summary of the official touring of the European staff is submitted in annexure I to this report.

There were the usual minor fluctuations in temporary African staff during the year but the average position of the instructor staff was as follows:—

Instructors:	Tanga and Pangani	Korogwe Lushoto	Handeni	Pare	Vacancies
Grade III, L.C.S.	1	1	1	1	1
Grade III, L.C.S. Copra	1	–	–	–	3
Ungraded, L.C.S.	12	18	11	8	–
Ungraded, L.C.S. Copra	14	–	–	–	2
Ungraded F.P.S.	10	16	9	7	–
Cotton Tax Services	–	–	2	2	–
Citrus Industry	2	–	–	–	–
In Training	2	5	1	4	–

Five pupils entered Ukiriguru Instructors' Training School in January, 1947, and six who had entered in September, 1945, returned at the end of the year. Less difficulty was experienced in 1947 in attracting men of a higher standard of education to become pupils on probation, owing to the higher rates of pay the department is now offering. Altogether twelve men who had passed standard X at school were signed on in the department and a further six were absorbed into the Mlalo rehabilitation scheme making eighteen in all, of whom sixteen are proving suitable and two are doubtful.

The balance of the instructor staff, with a few notable exceptions, must, as time goes on, give way to better-educated men. The general standard of education in the province is becoming increasingly higher and the time when an illiterate instructor could move about repeating a lesson parrot fashion is rapidly passing. In the Pare district, more particularly, native enterprise is now demanding a better-educated instructor.

The number of letters and telegrams received in the Senior Agricultural Officer's office during the year was 2,052. The outgoing mail (exclusive of vouchers, issue notes and the like) amounted to 2,143.

WEATHER

Up to 1947 the province had experienced some years of unfavourable crop seasons. The Western Usambaras had had four consecutive bad years and most of the coast, the "rain shadow" areas around the Pares and the populated parts of Handeni subdivision, had experienced two very poor seasons running.

The province is very diversified in crop seasons, ranging as it does from high mountainous conditions through fertile foot hills, valleys and dry arid areas to coastal plains. In spite of the diversified meteorological conditions, however, there were good short rains, good "between" rains (known as *Mchoo* on the coast and *Mulwati* in the mountains) and favourable long rains which tended, if anything, to be too heavy.

The following table shows the monthly rainfall at the four main recording stations in the province with the average rainfall for each particular month over the years :—

Rainfall in Inches 1947

	Tanga			Korogwe			Lushoto			Same		
	Ins.	Days	Av.	Ins.	Days	Av.	Ins.	Days	Av.	Ins.	Days	Av.
January	1·82	2	1·55	4·12	6	1·90	3·36	11	2·97	4·60	7	1·07
February	0·17	2	2·24	1·16	3	1·37	3·43	9	3·07	1·45	3	2·23
March	3·01	11	5·97	3·95	11	4·65	6·57	14	5·90	7·76	13	3·44
April	15·28	19	9·16	11·99	19	11·01	15·70	21	9·11	5·81	16	5·42
May	18·53	21	12·83	16·62	18	12·04	17·07	28	7·05	4·60	17	3·37
June	1·98	7	3·47	2·07	10	3·11	1·33	11	2·20	–	–	0·28
July	0·10	4	2·02	0·06	1	1·43	0·08	2	1·39	–	–	0·11
August	3·55	20	2·81	1·68	16	2·05	1·50	6	0·84	–	–	0·69
September	4·70	19	3·16	3·18	15	1·87	2·48	7	0·54	–	–	0·49
October	1·78	12	3·91	2·75	7	2·59	0·55	5	1·24	0·35	4	0·86
November	1·88	10	4·07	2·51	10	2·13	1·64	6	3·90	0·51	10	2·08
December	3·75	8	2·75	1·89	2	2·23	1·85	7	4·46	4·33	17	2·91
Total	56·55		53·94	51·98		46·38	55·56		42·67	29·41		22·95

CROP PRODUCTION

General.—The policy of increased production of food, with the emphasis on root crops, continued to pre-occupy the staff. There is no doubt of the success of this policy for, in spite of the many previous bad seasons, cassava and sweet potato stands at the beginning of 1947 before the favourable season was under way, were extensive and formed a good insurance against yet another bad season should it occur. The good season that did eventuate made excellent grain crops, with the result that

for the first time for many years there was an abundance of food of all kinds, making it possible for the native to sell a fairly large surplus of grain. At the close of the year all efforts are being made to prevent the native from resting on his laurels and discontinuing his root crop planting because at the moment his larder is full.

Tanga and Pangani Districts.—Extensive cassava plots were measured by the instructors in the Tanga District for planting in the early months of the year. This involved constant checking up and a great deal of supervision. The brunt of this work is borne by the department and little help in most instances was given by the native authorities whose responsibility it really is to see that their people maintain adequate food reserves. A total of 1,223 convictions were secured in the Native Authority courts for failure to cultivate and these also were due to departmental initiative. It was represented by the Senior Agricultural Officer to the District Commissioner's conference that this state of affairs is unsatisfactory and that the native authorities should pull their weight. With this end in view, there have now been appointed seventeen native authority instructors in the district for this work in conjunction with the native authorities. They have been trained in the work and have taken over the purely "police" work from the department's instructors. A departmental instructor remains posted to each area to advise, instruct and report progress.

In Pangani the good season has already resulted in a slipping back in cassava planting and by March 1948 the reserves will be much depleted. There is no immediate prospect of food shortage, but the Jumbe Mkuu has not been doing his part in taking action against those who fail to plant and the shortage will eventually appear unless much work is put in in the early months of 1948.

The Pare District.—Because of a series of droughts and food shortages in the two preceding years, more attention was given to food planting in 1947, but a great deal remains to be done. Cassava is unpopular as a crop. In the lower lying areas west of the Pares which is dry climatically, a crop of maize is harvested only in the exceptionally wet year and in those sections establishment of cassava and more mtama planting are very necessary. No food shortage occurred in 1947 but this is due to the good season, or rather what must be regarded, in actual fact, as the exceptional wet year, and not to any great effort on the part of the people.

The Wapare are an exceptionally intelligent people with a comparatively high level of education. They have had political troubles and have tasted famine relief. This combination of circumstances has combined to give them the belief that they need not cultivate if they do not want to as Government will always feed them anyhow if they lack food. The District Commissioner is successfully persuading them that this is not so and planting, as stated above, was a little better in 1947 but still unsatisfactory.

The Lushoto Division.—Most of this area has been importing food since 1943. This is partly due to the reduction of potato production owing to the presence of Irish blight since 1943, but is due, too, to the succession of bad seasons made worse by very poor methods of land utilization, the laziness of the people and the debility of the majority of the native authorities. The crops during the year were successful owing to the excellent growing conditions and food importations ceased shortly after the first half of the year, but there is little doubt that 1947 was an abnormally wet year and that it is only in these abnormal years that adequate food will be reaped of the present crops grown. It is considered that some changes in a few areas to more suitable crops are necessary, such as from maize to wheat and buckwheat, and peas and sweet potatoes should be increased.

The Korogwe Division.—This area improved greatly during the year particularly in the Luengera Valley where many more people planted rice than in previous years. Cassava and bananas also increased and even the cotton crop was slightly bigger. This is due partly to the good season but this area has not had successions of bad

seasons like other parts. Its better production must also be ascribed to the stationing of more instructors and more European attention because of the availability of more staff.

The Handeni Division.—Weather conditions were excellent and this area broke all records of crop production. It has generally been regarded as a food importing area, but this year, after exporting over three thousand tons of maize, as well as pulses, beans, rice and other commodities, buying even stopped for a while for lack of sufficient facilities of transport and storage. The excellent season was the main factor. The area, however, has had similar seasons without reaching anything like the production of this year, and a great deal was due to the continuous safaris of the Senior Agricultural Assistant and his instructor staff for there were very greatly increased acreages of all commodities planted. There was no Administrative Officer stationed in Handeni during the crop year.

CROP PRODUCTION DETAILS

Rice.—Just over 2,000 tons of paddy was marketed in the province during the year and it is estimated that at least another 1,200 tons was held back for home consumption. The principal producing area was the South Pare eastern plain which sold just on 1,500 tons. This constitutes an increase of over 1,400 tons over the 1946 crop. The Luengera valley area of the Korogwe division had a great number of rice bunds laid out and an increased number of people cultivated the crop, which reached 180 tons sold. The Kitivu area of the Lushoto division also produced its share, as did also the Mombo and Mkomasi areas in the Lushoto division and Handeni. However, in spite of these apparent increases, there remains much room for improvement as better marketing arrangements were rather more responsible for the increase than was more extensive planting. The 1947 figure could be more than doubled if the people can be persuaded to exploit their potential rice land.

The sales of paddy in tons over the years is as follows:—

	Pare	Korogwe	Total
1942	2,120	... 580 ...	2,700
1943	1,370	... 390 ...	1,760
1944	745	... 135 ...	880
1945	606	... 159 ...	765
1946	24	... 23 ...	47
1947	1,583	... 425 ...	2,088

Maize.—In the absence of regular native authority markets, it is difficult to arrive at an accurate figure for sales of native maize, but checking of figures of sales supplied by such traders as are reasonably reliable, brings the minimum figure for native maize actually marketed in the province to 3,514 tons. The bulk of this came from the Handeni division and is due, not only to the excellent crop season, but to greatly increased areas under maize. The Handeni crop exceeded 3,000 tons and ample reserves are held for seed and home consumption.

The response of the sisal industry to the appeal by Government to plant more grain was excellent. One hundred and twenty tons of seed was imported from Kenya and was sold only on permit on receipt by the Production Committee of planting programmes from the various estates. The total acreage planted was 13,010 and the harvests amounted to 2,911 tons. The yield averages for the districts are illuminating being:—

Tanga District	1·86 bags per acre.
Pare District	1·58 „ „ „
Korogwe District ...	3·98 „ „ „

Individual yields on estates differ widely but those in the Korogwe District are generally around or over four bags per acre and only those that could have been planted earlier and farmed better have brought the average down. The highest single yield in Korogwe on one estate averaged 6·2 bags on a total of 721 acres, while the best in

the Tanga area over an acreage of any size was 3·5 bags on 610 acres near Muheza. In the Pare District one estate reached an average of 4·5 bags, but only on 132 acres while another on 566 acres averaged 0·4 bag per acre. The yields from estate maize in the last three years were as follows:—

Year	Acreage	Yield Tons
1945 ...	4,067	800
1946 ...	8,280	960
1947 ...	13,010	2,911

There is no doubt that the demand for maize in the province has caused both natives and Europeans to plant maize in areas where it cannot be economic for the crop to grow. Especially is this true of the Tanga and Pangani coastal plain area where the soils are light-coloured and very sandy. In those areas cassava and pulses are far heavier yielders and millets and sorghum yield better than the maize which in this good year gave crops in the region of one bag or less per acre. Similarly, in large tracts of Handeni three years out of four the rainfall is insufficient for a crop of maize and sorghum would be more suitable. If, however, maize must be grown then the short term types are more likely to grow. Both short term and sorghums are now under trial. The Pare plains also are far too dry for maize and there short term maize and sorghums have now been introduced.

Cassava.—The best showing of this crop for the last three or four years has been in Pangani District, but this year, while lifting has been usual, replanting has not kept pace and the result is that the acreage has begun to dwindle. In Ubondeni of the Tanga District increased plantings took place and the reserves of this food in the ground are good. Elsewhere the plantings are adequate, except in the Pare Plains where the crop remains unpopular, but the combined efforts of the District Commissioner and the Agricultural Assistant have undoubtedly made some improvement in the acreage under the crop.

Sorghums and Millets.—The bulrush millet crop on the Boma peninsular failed from excessive rain but the sorghum crop was good. The Handeni sorghum crop was greater than for some years. Efforts are being made to extend sorghum planting and seed of the hard types were introduced from the Southern Province for suitable areas.

Beans and Pulses.—On the coast gram and cowpea plantings were good in the short rains and the "between" rains, and harvests were satisfactory. Handeni had a greatly increased acreage of beans and sold an excellent surplus amounting to some two hundred tons and a variety of pulses was also obtained. In both the Pares and the Usambaras the long rains bean crop failed, largely because of insect damage, but the short rains crop was a fair one.

The total beans coming on the market is shown in the crop returns as 467 tons this year, but this is not a true indication of the actual crop sold as the larger portion of the crop is sold direct to estates and figures cannot be obtained. It is considered that the surplus beans and pulses sold in the province this year must have approached one thousand tons.

Potatoes.—This was one of the most important food crops of the Usambaras before 1943 but in that year Irish blight (*Phytophthora infestans*) appeared and since then the potato as a crop has become a scarce commodity. Prior to 1943 the surplus sold was between 1,500 and 2,000 tons. This year a total of 36 tons only was railed out of the Usambaras. In the Pares a similar state of affairs exists, but to a lesser degree as the potato there was a part of the native diet but did not reach so important a place as in the Usambaras. The reduction of the potato crop in the last five years in the Usambara mountain areas has had most important repercussions, for the population is dense and land is limited, and great difficulty is now experienced in growing sufficient food for its needs by the population. No other local crop can give the same quantity of nutritious food from so small an acreage as the potato crop, nor is any

other crop so certain of giving a good harvest in all the various climatic conditions that prevail in these mountains.

In 1944 the department commenced trials of local potatoes in the first instance to determine varieties resistant to blight. These trials had no success, and in 1946 importations from Kenya were made, still with little success, until actual blight-immune varieties bred at Corstorphine, Scotland, were obtained. Since then trial and multiplication of suitable blight-immune varieties from Scotland has been steadily pursued at the department's farm Kunguli, near Lushoto, with a good deal of success and seed potatoes of the three best varieties should be available in some quantity for native and European planters of the Usambaras by the end of 1948. A detailed report on the observation and multiplication of these varieties is submitted as Annexure II to this report.

The Muheza Orange Industry.—The orange crop is produced from the seedling trees of a great number of natives spread over a wide area of that portion of the Tanga District which has Muheza as its centre. The climatic conditions vary somewhat within the orange area and the trees themselves vary greatly in their ages and condition. It can be well appreciated that collection and marketing a crop of this kind, from the very many tree owners so widely scattered presents many difficulties. The industry is operated by means of a No. 2 account of the local native treasury with Messrs. Dalgety and Co., Ltd., as the operating agents. There are two crops a year. The main crop occurs generally from mid-April to August and the fly crop from October to December, occasionally extending as late as February. The production figures for the last four years were as follows:—

	Main Crop Tons	Fly Crop Tons
1944 ...	1,413	200
1945 ...	1,411	85
1946 ...	264	920
1947 ...	278	515

It will be observed from the above-quoted figures that the crop is subject to great fluctuations and this makes regular marketing contracts very difficult, particularly as estimating a scattered crop of this kind is also a very chancey business. During the war years the War Supplies Board in Nairobi purchased practically the whole crop and marketing did not present very great difficulty, but this year with the Board not purchasing and the industry having to rely entirely on commercial selling the main troubles of the industry really began. Investigation revealed that a good market exists in Nairobi for raw orange juice in barrels and, although the buyers were tied up in contracts with South African suppliers, these agreements were not long-term and a sufficient free market was also available to take trial shipments. A loan of £500 was therefore obtained by the Native Treasury No. 2 account from the Development Commission to install a pilot juice extraction plant and this was duly put in by Messrs. Dalgety. The plant was brought into use with the fly crop and, in spite of false starts and breakdowns while the labour was being trained, 3,020 gallons of pure juice was produced and sold to Kenya. So far orders for 1948 amount to 4,000 gallons. This is a great step forward in the improvement of the industry as oranges come to the markets in varying degrees of ripeness and the large percentage of fruits that are too ripe to carry, and were formerly bought and then thrown away, can be turned into juice profitably. Those oranges also that have reached borderline ripeness can be similarly treated and so appreciably reduce the usual ten per cent to twenty per cent wastage of consignments of fresh fruit arriving in Kenya.

It is not proposed to go into the details of the finances of the industry here but it must be mentioned that the industry has now shown a financial loss for two consecutive years. The figures are as follows:—

	£
1944 Net Profit	807
1945 Net Profit	759
1946 Net Loss	625
1947 Net Loss	540

The prices to the grower are paid by weight and worked out as follows:—

1944	Shs. 5/41	per 1,000	oranges.
1945	,, 6/80	,, ,,	,,
1946	,, 6/32	,, ,,	,,
1947	,, 6/47	,, ,,	,,

It will be appreciated from the above-quoted figures that paying less to the growers will help little, if at all, for the price cannot well be reduced to less than the present figure. The real cause of the losses are, of course, the cessation of buying by the War Supplies Board, but at the close of the year buying by the military authorities in Kenya was restarted on a small scale and prospects may well be brighter for 1948. Nevertheless the industry's costs of working are somewhat unsatisfactory and there appear to be economies that can be effected, given some time. Meanwhile, this office is working in the closest collaboration with the District Administration of Tanga and Messrs. Dalgety to effect all the economies possible.

The orange industry was the centre of some political agitation during the year, stirred up by a group of members of the committee of the Muheza Welfare Centre. It appeared that orange growers were not kept informed of the finances and general working of their industry and the political agitation, starting off as local politics, really took shape after a while into what amounted to a perfectly justifiable complaint. A series of barazas was held by the Agricultural Officer, Tanga, in which he explained all the aspects of the industry. He prepared also a leaflet for printing and distribution which incorporates a simple balance sheet covering the industry from the start, and showing the reasons for all the different decisions that have been taken by Messrs. Dalgety and the government officers concerned over the years. The growers have also been shepherded into electing a representative committee to act as a liaison between the growers on the one hand and the agents and the government departments concerned on the other. Now that the growers are better informed they appear generally satisfied, and, in any case, the agitation was actually political with the orange industry as a pretext. It is fairly certain the agitation never had the support of the majority of the orange growers.

Other Fruit.—The production of fresh fruit other than oranges for sale amounted to one thousand, five hundred and eighty-nine tons made up as follows:—

	Tons
Bananas exported from Pangani	1,172
Mixed fruit other than oranges from Muheza	266
Mainly plums and peaches from the Usambaras	151
	1,589

The mixed fruit from Muheza has declined, the comparative figures for four years being:—

	Tons
1944	842
1945	803
1946	584
1947	266

No explanation is offered for this other than that with the departure from Kenya of large numbers of military ranks markets are not so easy as hitherto.

Coconuts and Copra.—The purchases of copra fell this year. Comparative figures for the last four years are as follows:—

	Tons
1944	3,494
1945	3,804
1946	3,786
1947	2,684

Of the 1947 figure 1,899 tons were from the Tanga District and 785 tons from the Pangani District. Milling figures for the year were as follows:—

	Tons
Copra Milled	2,187
Coconut Oil produced	1,203
Coconut Cake	765

Extraction was 55 per cent and wastage 10 per cent of the original copra. A small quantity of copra was exported from the province.

Two close seasons for picking were enforced by Native Authority order during the year with the object of reducing theft, assisting to mature nuts and to stop curing in the rains. The great drawback, however, is that the rules cannot be applied to non-natives nor to natives in the township.

One thousand and sixty-one selected coconuts were planted at Boza near Pangani and are making good progress. The selections were made from palms that have been under observation for some five years and of which regular yield counts had been made.

It was decided during the year that the proposed marketing and grading scheme, held in abeyance now for two years for lack of staff, should be abandoned for the present. It was felt that the application of legislation to enforce grading would undoubtedly tend to improve matters but that the whole scheme was one depending on a staff of "policemen" which could be applied better later when instruction and facilities for kiln curing of copra could first be made available. Plans are now complete to start a central battery of pilot kilns in Gombero where a sufficient number of palms are concentrated. Here whole nuts will be bought from the natives and, after maturing, they will be turned into copra. If this pilot effort is successful, the same principal will be extended to other areas and groups of coconut growers may be schooled into operating their own kilns co-operatively on a sufficient scale to employ skilled men. The scheme has its faults, not least of which is the cost of transporting whole nuts, but such matters need not prove insurmountable. The sites at Gombero have been chosen and the whole scheme has been approved by the Native Authority and the people.

Cotton.—Owing to the previous poor seasons for food crops, cotton received little attention from the growers until the main food crops were in. The cotton crop tended, therefore, to be late. Propaganda for planting before planting time, which included the publication of the new basic price of 42 cents per kilo, had little effect, and it was not until buying commenced later on that many natives expressed chagrin at not realizing the fact earlier that the price was so good. The crop was a little better than last year but is still much below average. The following are the figures for the 1947 crop:—

Seed Cotton in Tons

	Grade I	Grade III	Total
Pare District ...	158·634 ...	19·033 ...	177·667
Handeni District ...	60·872 ...	11·134 ...	72·006
Korogwe District ...	44·809 ...	8·455 ...	53·264
	264·315 ...	38·662 ...	302·937

The total cash paid out to growers for their seed cotton amounted to £5,693. 4shs. 96cts.

Production over the previous seven years of seed cotton in tons was:—

	YEAR						
	1940	1941	1942	1943	1944	1945	1946	1947
Pare District ...	1,323 ...	480 ...	1,078 ...	442 ...	335 ...	52...	96 ...	159
Handeni District ...	1,105 ...	890 ...	155 ...	153 ...	35 ...	24...	81 ...	61
Korogwe District ...	305 ...	171 ...	259 ...	127 ...	50 ...	14...	25 ...	45

Coffee.—The total crop of the Usambaras amounted to 172 tons of mild coffee. In addition nine tons of hard coffee was sold by natives in the Eastern Usambaras. Of the 172 tons of mild coffee produced 36 tons was native produced. Production of mild coffee for the last six years in the Usambaras in tons parchment was as follows:—

	Native	Non-Native
1942 ...	... 20	... 150
1943 ...	... 8	... 62
1944 ...	... 17	... 116
1945 ...	... 40	... 110
1946 ...	... 32	... 43
1947 ...	... 36	... 136

The Pare native crop amounted to 38 tons. It is dealt with entirely by the natives themselves who collect it and send it to the Tanganyika Coffee Growers' Association for curing and sale. The Usambara native crop is dealt with under a Native Treasury No. 2 account which is supervised by the Senior Agricultural Officer. The account has over £1,000 accumulated profit which is used for advances for coffee on collection and before sale. A further use is to employ a clerk and to purchase implements and coffee machinery for resale on easy terms to growers. The coffee is marketed through the Tanganyika Coffee Growers' Association. The price paid to growers this year for 1st quality parchment was 50 cents per kilo advance on delivery and a later final payment of 80 cents per kilo, making Sh. 1/30 per kilo total.

Tobacco.—The production of roll and cake tobacco maintained its level in 1947 in the Usambaras. There are two varieties grown, viz. Western tobacco the seed of which has no doubt come in from Songea and Iringa, and a local type of what appears to be *Nicotiana rustica*. The latter is very strong and patches seen were freer from disease than the Tabacum type. Exports (in tons) from the Usambaras since 1937 were as follows: 1937, 33; 1938, 41; 1939, 40; 1940, 43; 1941, 40; 1942, 35; 1943, 45; 1944, 122; 1945, 75; 1946, 137; 1947, 110.

This roll and cake tobacco production constitutes a valuable economic crop in the Usambaras. Prices ranged during the year to as much as Shs. 2/- per kilo, and, putting the price at an average of Sh. 1/50 per kilo, the value of the actual crop sold and railed amounted to £8,250.

Wheat.—There were over seven hundred growers of wheat in the Usambaras during 1947 and the season was very free of both stem and yellow rusts. The variety Sabanero is being encouraged as a food crop in the higher colder areas which are subject to both rusts and where maize yields are low. The crop is also being pushed in the 5,000 feet range, where the variety Kenya Governor should be fairly safe from stem rust.

Beeswax and Honey.—These commodities are produced in small quantities throughout the province, but it is the Handeni division that is the most suitable. A great deal of propaganda for the installation of bark hives by natives was undertaken and there were installed during the year many thousands of hives. The production of beeswax is mostly sold in Morogoro and no records are available. The honey production is sold by direct native trading to natives in the Usambaras where honey is always a part of bride-price. Through regular trade channels, 235 tins of honey were sold by traders but that figure bears no relation to the total production.

Vegetables.—Production dropped slightly in the Usambaras because of the exceptionally heavy rains during April and May. Shipments dropped to the lowest level during May and did not reach a fair average again until October. Another factor causing a drop was the poor seed on sale by the department which, however, improved with new importations later in the year. Total exports from the Usambaras to Tanga and Dar es Salaam amounted to 361 tons. Exports for the last three years, in tons, were as follows: 1945, 625; 1946, 390; 1947, 361.

Some 36 lb. of vegetable seed was sold by the department to natives during the year. This was mostly in fifty cent packets. With the closing down of seed production by the Agricultural Department of Kenya, supplies were unsatisfactory. Unsuitable varieties were in many cases purchased owing to the lack of better ones, but towards the end of the year the position improved. Attempts were made to get local traders or the Native Authority to take over the sale of vegetable seeds but no one will do so, and this work must perforce be continued by the Department if the level of vegetable production is to be maintained.

Onion production in the Usambaras increased but exports of the crop did not increase as the Wasambaa are unwilling to sell at prevailing market prices. Onions from Moshi can be bought delivered at Korogwe and Tanga for less than natives in the Usambaras are willing to sell for at their local markets. Shipments from the Usambaras were only 17 tons during the year although a hundredweight of seed was bought from the department by natives. Treble that quantity of seed could have been sold if the full demand had been met.

Betelnuts.—The production figures, in hundredweights, for the last six years are as follows: 1942, 990; 1943, 696; 1944, 1,856; 1945, 815; 1946, 1,082; 1947, 1,311; valued at approximately £5,110. Exports are all from Pangani.

Sisal.—Fibre production (in tons) for the last six years was as follows:—1942, 53,762; 1943, 55,532; 1944, 59,693; 1945, 59,285; 1946, 54,727; 1947, 54,718.

The decline in production in 1946 caused by the repatriation of the war-time conscript labour was not made up in 1947 owing to continued shortage of labour. Towards the end of the year, however, the extension of the activities of the labour recruiting organization, with its rapidly increasing efficiency, greatly alleviated the position, and, at the close of the year the labour position was much improved.

Tea.—Production, in pounds, of made tea remained at the same level as that of 1946. Production for the last twelve years was as follows: 1936, 98,925; 1937, 115,716; 1938, 240,020; 1939, 309,120; 1940, 324,602; 1941, 337,337; 1942, 568,202; 1943, 470,452; 1944, 411,000; 1945, 398,000; 1946, 339,192; 1947, 342,000.

Now that tea restriction is no longer enforced, substantial new plantings are planned and are taking place, but are limited somewhat by scarcity of tea seed owing to restriction on export of seed by the Government of India. The season for tea production was a favourable one hence the level of production for the year was disappointing.

Papain.—Restriction on planting continued during the year, nevertheless, some 1,250 acres was planted in the Tanga, Pare and Korogwe districts. Production has really not yet started as the young plantings are not yet bearing. Production from the old plantings amounted to some 27 tons of papain.

Cinchona Bark.—Production in tons, over the last four years was as follows: 1944, 60; 1945, 71; 1946, 92; 1947, 49.

Some increases in planting took place and the existing number of trees is put at some five million. There are two estates with a million trees each, and three other estates with over half a million each. In addition there are nine other estates having appreciable plantings of cinchona. The estates lie in the Eastern Usambaras and on the eastern side of the Western Usambaras.

Kapok.—The records of railings and exports show 62 tons despatched but this is not a true indication of production as stocks are often held over.

Derris.—This crop has declined and most estates that formerly planted a little appear to have given it up. Production reached about 15 tons only.

Essential Oil.—Bitter orange oil production was 2·675 tons.

Condiments.—2·303 tons of black pepper and 5·832 tons of chillies were produced during the year.

Palm Oil.—24·908 tons of palm oil and 16·809 tons of kernels were the products of 1947.

Cacao.—Production amounted to 2·85 tons.

Kweme Nuts.—Only one estate still produces this in the province, and its production was some one and a half tons.

Tung Oil.—The acreage remained around 210 acres but accurate production figures were not obtainable. The figure was around some 15 tons of nuts which should produce 8,000 to 9,000 lb. of oil.

Sugar.—New machinery has been installed on the one estate about twelve miles up the Pangani River, and some hundreds of acres of cane are coming into production. Approximately 100 tons of jaggery was produced in 1947.

PESTS, DISEASES AND VERMIN

Insect Pests.—The banana weevil (*Cosmopolites sordidus*) had been causing serious damage on the Moshi Pare border and on the suggestion of the Senior Agricultural Officer, Northern Province, a clean-up was instituted in North Pare which was reported to be successful. Stalk borer in maize was fairly prevalent around Muheza and parts of Korogwe but not more so than usual.

Coconut beetle on the coast, in both native and a few non-native plantations, continues to be the subject of a great deal of effort on the part of the staff with the usual unsatisfactory lack of progress. There are several fairly large non-native plantations, however, that have been cleaned up completely, but the situation in native shambas, both as regards the beetle and general sanitation, is deplorable, and, the native authorities concerned are supine in this, as in all agricultural matters on the coast.

Locusts.—The province was free of locusts throughout the year.

Diseases.—Irish blight (*Phytophthora infestans*) was more severe even than usual in the Usambaras and other mountain areas. Early blight (*Alternaria solani*) was present in all potatoes but did no damage. Other diseases of potatoes present during the year were brown rot (*Xanthomonas solanacearum*), leaf roll, black scurf (*Rhizoctonia solani*) and a number of types of storage rots and of leaf spots.

Leaf stripe (*Helminthosporium gramineum*) in barley and yellow rust (*Puccinia glumarum*) in wheat were found in the Usambaras. A number of identifications of *Armillaria* on tea roots were made by the Plant Pathologist. A variety of diseases on vegetables in the Usambaras were more prevalent this year owing to the abnormally wet season.

Vermin.—No pink arsenic could be obtained during the year for baiting pig and baboon and it was reported that the old stocks had lost their toxicity. The various poison gangs were given up for lack of material in the various districts. Pig were less active in the coastal districts owing to the presence of lions. A number of drives were organized in Handeni by the instructors. Altogether 1947 was not a bad year for damage from vermin.

MARKETING

It was agreed at the conference of District Commissioners and technical officers in May that the native authority markets proposed for paddy in the Pare district be regarded as "an experiment" and if successful, a similar system might be put into effect in other parts of the province. The "experiment" (already successful in all other provinces for many years) was, of course, a success and control of the paddy crop

of the Pares was obtained for the Economic Control Board. The crop amounted to just on 1,500 tons as against a similar crop in 1946 when control of only 42 tons was secured. In the Luengera Valley of Korogwe the bulk of a good crop was lost to black marketing, but some crop was secured in the Kitivu and Mkomasi areas.

In Handeni, where comparatively large grain crops were available for sale, buying posts were declared for all produce at the sites of all cotton markets and cotton buying posts and these were operated as markets successfully.

There still remains room for a great deal of improvement in the conditions of marketing of native crops in the Province but the problem needs careful organization because of the large numbers of estates that buy produce direct from native cultivators.

SOIL CONSERVATION

For many years the number of officers posted to the province precluded attention to soil erosion in all but the Western Usambaras. The Eastern Usambaras, the Pares, the Muheza area, Handeni and other parts have received little attention and erosion of the soil is rife in those parts. A responsible officer was posted to the Pares during the year and a fair amount of progress, due in no small measure to strong Administrative support, was made. Between two and three hundred thousand yards of effective contour banking was achieved.

In the Western Usambaras all soil conservation work suffered from political activity amongst the people. The comprehensive soil conservation rules proposed in 1946 were accepted by Government and were approved by the chief, but nothing could be done to implement the rules, because of opposition by the people. However, the planting of live contour hedges was enforced where possible, but the subchiefs do not have sufficient control over their people to assist in any marked effective way, so that very little progress can be reported.

THE MLALO REHABILITATION SCHEME

The Mlalo Basin is an area of some sixty square miles. It is situated in the Western Usambaras and is considered as typical of the overcrowded and eroded areas of the mountain mass. It was chosen, therefore, as the best centre in which to study the social and agricultural problems arising from the apparently increasing population and the dwindling soil productivity, as well as in which to demonstrate the various means of overcoming these problems.

The scheme commenced in 1946 with the posting of an Agricultural Officer to the area. For the first twelve months, that is until mid 1947, it suffered from confusion resulting from a suitable means of supervising the multiple activities, and little progress was made. Later the whole scheme, including the funds, was handed over to the Senior Agricultural Officer since which time the single control has proved to be more satisfactory. The Senior Agricultural Officer is responsible to the Provincial Commissioner who acts as chairman of a provincial committee composed of the various technical officers concerned with the scheme. The whole project may be divided into two main parts. The first is the village survey, which is collecting information about the lives, health and habits of ten per cent of the families of each administrative unit and vital statistics of the whole population. The second is the demonstration, in a defined area, of various methods of land utilization and improved village life.

The village survey is carried out by a number of men who have all passed standard X at school, assisted by native medical and veterinary staff. Questioning of the people is carried out in the local language, and recording of statistics is made in English on twelve specially printed forms. The survey will take about eighteen further months to finish and the collection of vital statistics will be carried out for one calendar year in 1948, month by month, in every village throughout the Mlalo Basin. A few preliminary indications are quoted from the report of the Agricultural

Officer but these must be regarded as indications only and are not final. The total population of the Mlalo Basin is 20,087 souls including absentees. The percentage of absentee males presumably away at work outside the area amounts to 17·40 per cent. The total cattle in the area is 5,578; sheep amount to 3,196 and goats to 4,988, while poultry counts total 16,106.

In the sample village survey of one administrative unit (an Mtaa) the Agricultural Officer reports; Total population, 4,502; percentage males absent 17·60 per cent; cattle 1,778; sheep and goats 2,410; poultry 3,906.

In regard to the health of these people the examinations show, among the randomized samples of apparently healthy people, that the incidence is, in percentage: Hook worm, 21·25; Round worm, 32·08; Malaria, 13·73; Spleen, 23.33; Scabies, 10·83; Ulcers, 4·17; Gonorrhoea, 1·25; Syphilis, 0·42; Conjunctivitis, 0·62; Tape worm, 0·21.

Land, which has always been presumed to be short, is reported on by the Agricultural Officer as follows for the same Mtaa: "The average family holding is 5·01 acres split up into 10·41 fields of an average acreage of 0·48 acres each. . . . The fields are generally situated on slopes varying from 0 to 35 degrees. The slope distribution of the samples surveyed is as follows:—

0 degrees slope	0·676%	of the fields.
1 to 4 degrees slope	14·054%	,, ,,
5 to 9 ,, ,,	15·540%	,, ,,
10 to 14 ,, ,,	21·351%	,, ,,
15 to 20 ,, ,,	20·688%	,, ,,
20 to 30 ,, ,,	25·406%	,, ,,
30 to 35 ,, ,,	2·296%	,, ,,

Turning to the second phase of the scheme, viz. the demonstration area, this consists of the Mtaa of Shita. A basic contour map has been prepared and a number of copies printed to facilitate records and to define and show on paper the definite policy for the treatment of every part of the area. Paid labour is used. The tentative policy outlined by the originators of the scheme visualized rehabilitation by means of controlled pasture but the executives have modified this because of the indications of the Village Survey that land is too short and, in any case, the slopes are too great for any pasture to endure when grazed. It was decided, therefore, to bring all eroded land back into cultivation where slopes are possible, and to carry out rehabilitation by the means used by other mountain tribes in various parts of the Territory.

The means being brought into use are:—

(a) The exclusion of cattle from slopes and confining grazing in rotation to communal pasture on the flat floor of the valley.

(b) The planting of elephant grass and other grasses for cutting and stall feeding of the cattle and the separate housing (not with humans as is usual) near to the pasture paddocks which are hedged with sisal.

(c) Demonstration fields are laid out on the Hehe method, i.e. ridge cultivation after burying green material under the ridges to break down.

(d) Terraced shambas have been made and quantities of available organic material buried in the soil of terraces.

(e) Contour ridging at intervals on the lesser slopes.

(f) The introduction on the steepest slopes of the Umatengo system of cultivation, i.e. the checker board pit system which incorporates all plant residues and green weeds in the pits.

In addition, pastures are being improved by the laying down of *Pennisetum salifex* and *Chloris gayana*. Various other grasses are being tried.

During the year ten instructors' houses and an office have been built.

Progress, as mentioned above, has been slow for the first year but has speeded up during the last six months. Political troubles have been common and organized opposition by an African society has been rife, but there is every hope of improvement in the political situation in the new year and, in any case, the scheme will go on faster as persistence wins the confidence of the people.

THE LUENGERA AND KITIVU IRRIGATION PROJECTS

The Luengera project visualizes people on the overcrowded eastern side of the Western Usambaras coming down to the Luengera Valley below annually to cultivate rice if irrigation is provided for them. The Kitivu scheme would provide a similar plan in the Kitivu Plains for the people of the western side of the mountain mass. The latter project has not yet been started, but the Luengera scheme is being surveyed.

Originally, the irrigation channel was planned to take water from the right bank of the Luengera River along the base of the foothills of the mountains. A detailed survey was carried out and, when plotting was completed, it was found that most of the land that could be irrigated was held by estates and the balance left for natives could nearly all be served more cheaply and as efficiently by rice bunds designed to catch the ordinary flood water. The process of designing the scheme was therefore, reversed. A reconnaissance was made first to find suitable land for rice. Some two to three thousand acres of native land was located in one block on the opposite bank and a detailed survey to layout a furrow line to serve that land, or a portion of it, is now in process at the close of the year. The preliminary reconnaissance has already shown that the scheme is feasible and the line is possible. The new line lies on the left bank of the river.

Other preliminary work must still be done. It is known that twenty-five cubic feet of water per second can be taken from the river without affecting the Pangani Falls power station lower down, but it is not known what acreage of land under rice that quantity of water will maintain in that area by irrigation. At the end of the year a small pilot furrow was commenced with volunteer labour, to irrigate a small block of 100 acres. By simple measurement of water required to irrigate this block, or part of it under rice, it will be found what area of our 2,000 acre block to prepare for the available twenty five cusecs of water.

HOUSES FOR FIELD OFFICERS

The house started and almost completed in 1946 at Same was finished during the year. It is a permanent brick structure with two large bedrooms, water-borne sanitation and all the usual rooms and offices. The total cost of the house inclusive of furniture was £1,118 5s. 14cts. A revote of the balance of £31 14s. 96cts. is being requested to build a garage as the original vote was £1,150.

PRODUCTION COMMITTEE

The Korogwe District production committee acted more or less as a provincial committee for the first half of the year, but was considered to be more representative of the Korogwe area than it should have been in order to serve the whole province effectively. The Tanga, Korogwe and Pare districts production committee, under the chairmanship of the Senior Agricultural Officer, came into existence in the latter part of the year and was, after consultation with other bodies, made as representative of the province as possible.

Three meetings of the committee were held during the year and advice was tended to the Director of Agriculture on a variety of agricultural matters. The committee dealt with claims for acreage bonus for 12,710 acres of maize and recommended payment of acreage bonus amounting to £19,985 12s.

SEED FARMS

The Native Authority seed farm at Handeni was maintained and short term sorghum and other suitable crops were multiplied.

The department's farm at Lushoto was developed and maintained for potato work. A separate report on it is attached as annexure II to this report.

MEETINGS, VISITS AND CONCLUSION

The Senior Agricultural Officer attended two conferences of the District Commissioners and technical officers of the province in Tanga, as well as a number of meetings in the Provincial Commissioner's office on the Muheza orange industry, coconut and copra matters, etc.

The Director of Agricultural Production visited the province on a number of occasions and on one occasion toured parts of the Korogwe district and the Mlalo scheme. The Deputy Director toured parts of the Tanga and Korogwe districts, including the Luengera and Mlalo, in the latter part of the year. The Plant Pathologist paid two visits to the Usambaras in connection with potatoes, and the Entomologist (Morogoro) paid one.

His Excellency the Governor paid his annual visit to the Usambaras and the Mlalo scheme.

The Department of Agriculture must acknowledge the co-operation of the Administration and of all departments in the Tanga Province in assisting in its work.

C. J. McGregor,
Senior Agricultural Officer,
Tanga Province

Travelling of Officers

	Stationed in Tanga Province	Nights absent from Station	Days absent from Station	Total time on safari
Mr. H. Doggett, Agricultural Officer, Tanga	12 months	76	58	134
Mr. G. Hilditch, Crop Supervisor, Tanga	1 month	20	5	25
Mr. B. S. M. Host, Agricultural Assistant, Pangani	2 months	47	8	55
Mr. V. S. Greve, Crop Supervisor, Muheza	2 months	43	1	44
Mr. T. Jarrett, Agricultural Assistant, Pares	9 months	171	23	194
Mr. L. Leslie-Moore, Senior Agricultural Assistant, Handeni	8½ months	240	0	240
Mr. T. J. Taverner, Agricultural Assistant, Lushoto	12 months	102	45	147
Mr. G. H. McGavin, Agricultural Assistant, Pares	1 month	–	–	–
Mr. J. S. Gunn, Agricultural Officer, Pares	3 months	29	18	47
Mr. J. B. Clegg, Agricultural Officer, Malindi	12 months	Works in circumscribed area making absence unnecessary.		
Mr. C. J. McGregor, Senior Agricultural Officer	11½ months	79	71	150
	74 months (or 2,220 days.)			1,036

Kunguli Farm, Lushoto

The farm consists of the site of the old camphor factory used during the war to exploit the adjoining Forestry Department camphor forest at Lushoto. It is nineteen acres in extent and was ceded to this department by the Forestry Department from forest reserve many years ago. It was used before the war and again after the war for a time, by the Native Authority as a seed farm, but was closed down in 1945 and reverted to the Agricultural Department and since that time it has been used as a potato observation station.

Development

During the year an irrigation furrow was laid out and brought into use, all the swamp land was drained and used for multiplying potatoes and a large store for sprouting potatoes was built. Terracing of some sloping land was also carried out and the farm was generally prepared to extend the potato multiplication work in addition to the observation work already in progress.

Potato Observation and Multiplication

The general cultural practises already established on the farm were continued with all potato work, the only change being that irrigation was by means of a furrow and not by water pumped from the river as formerly. The various varieties of potatoes from Corstorphine that are being tested are shown below:—

1256(23).—Planted 23rd September, 1946. Harvested 27th January, 1947. Total yield 89 lb. at the rate of 8·3 tons per acre. Contracted *Phytophthora infestans* (Irish blight).

Planted again 16th April, 1947. Harvested 8th August, 1947. Total yield 169 lb. at the rate of 7·2 tons per acre. Again affected by *Phytophthora infestans*.

Discarded owing to susceptibility to *Phytophthora infestans*.

653d(22).—This variety was suspected of being affected by leaf roll virus. One healthy plant was multiplied in 1946 and by 7th January, 1947, this was worked up to 25 setts.

Planted again 16th April, 1947, and harvested 19th August, 1947, yielding 21 lb. at the rate of 8·0 tons per acre.

Planted again 8th December, 1947, and growing well, free from *Phytophthora infestans* and leaf roll.

The tubers are rather small but the yield is improving. To continue multiplication and observation.

835a(4).—Planted 7th October, 1946. Harvested 27th January, 1947 and yielded 86 lb. at 8·4 tons per acre. A number of tubers rotted in store from an unidentified cause.

Planted again 18th April, 1947, and harvested 26th August, 1947, a total of 362 lb. at the rate of 7 tons per acre but again rotting occurred.

Planted again 3rd December, 1947 and growing well. Free from *Phytophthora infestans* but not a promising variety. To continue multiplication and observation.

834c(29).—This variety was discarded as it appears to suffer from inherent weakness. A total of 19 setts planted 16th April, 1947, and harvested 19th August, 1947, yielded very little and made poor growth. The tubers rotted in store.

931b(5).—This variety had similar characteristics to 834c(29). A planting made on 19th August, 1947, yielded little and made very poor growth. It was discarded.

833b(98).—Planted 23rd September, 1946. Harvested 268 lb. 27th January, 1947, at the rate of 13·7 tons per acre.

Planted again 16th April, 1947, harvested 5th August, 1947, a total of 512 lb. at the rate of 12 tons per acre.

Planted again 1st December, 1947 and growing well.

This is one of the promising varieties but it has, after both harvests, suffered from rotting in store, the rot being unidentified. It has had no sign of any serious field disease and is a good yielder of rather too large tubers which are very palatable and more floury than the 914 varieties.

914b(52).—Planted 7th October, 1946. Harvested 18th February, 1947. A total of 129 lb. at the rate of 10·4 tons per acre.

Planted again 7th May, 1947. Harvested 3rd October, 1947. A total of 315 lb. at the rate of 6·4 tons per acre.

Planted again 4th December, 1947, and growing well.

This variety has not fulfilled its early promise of being the best variety imported. It has yielded poorly but it is possible that this was largely due in the May planting to the abnormal rains which lasted on and off for some twenty-two days soon after planting. The variety has many attractive features particularly as regards its medium-sized tubers and its superior flavour. The present planting will give a fairer trial of its yielding qualities than the last. It remains free of any serious field or store disease.

914a(91).—Planted 31st October, 1946, and 19th November, 1946. Harvested 18th February, 1947, and 2nd April, 1947. Total harvest 1,725 lb. at the average rate of 8·9 tons per acre.

Planted again in several lots July and August 1947 and harvested a total of 15,556 lb. in November and December at the average rate of 9 tons per acre.

This variety is an excellent storing potato but this too makes it slow to multiply owing to difficulty in breaking dormancy. It is inclined to produce oversize tubers and is rather waxy in texture when cooked, nevertheless so far it is the most reliable and consistent cropper and so far is free of all serious field and store disease.

Six varieties below were received from Corstorphine in March 1947 and were planted together when they were sprouted on 16th April. A seventh variety 877a(34) was received in January 1947 and this was planted with the others.

914a(91).—This is the same variety as the one received first in 1946 and which leads all the others. This sample maintained its place. Twelve cut setts yielded 19 lb. of tubers which is at the rate of 14·8 tons per acre. Maturity was 116 days.

Planted again 99 setts on 8th December, 1947, and doing very well indeed maintaining freedom from serious field disease.

914a(12).—This variety is stated to be doing well in South Africa. It is very similar to 914a (91) and yielded 10 lb. from eight setts which is at the rate of 11·7 tons per acre. Maturity was also 116 days.

Planted again 71 setts on 8th December, 1947, and doing well maintaining freedom from serious field disease.

1092a(4).—A very promising variety earlier than all the others by some ten days. It yielded 8 lb. from six setts, i.e. at the rate of 11·1 tons per acre and no tubers were unduly oversize.

Planted again 8th December, 1947, a total of 36 setts doing well and free from serious field disease.

1085(6).—Similar to 1092a(4) but later, maturity being 116 days. It yielded 7 lb. from six setts being at the rate of 10·9 tons per acre.

Planted again 8th December, 1947, a total of 41 setts and growing well free from serious field disease.

1082a(2).—Similar to 1085(6) but yielded less 8 lb. from nine setts, i.e. at a rate of 8·3 tons per acre.

Planted again 36 setts on 8th December, 1947, and growth fair and free from serious field disease.

877a(34).—This was received earlier to plant as a "filter" for it is susceptible to the C strain of *P. infestans* but is immune to the A and B forms. It did not contract *P. infestans* in spite of attempts to innoculate it. Planted again 8th December, 1947.

1271b(9).—This variety is also immune to the A and B strains of *P. infestans* and not to the C strain and it did contract *P. infestans* a month after planting. Planted again 8th December, 1947.

Other varieties planted to maintain *P. infestans* in order to innoculate the imported varieties and so prove immunity are:—

Kerrs Pink, Skerry Blue, Kinongo, Karaya and Arran Chief.
These all contracted *P. infestans*. The best yielder is Skerry Blue.

A package of promising potatoes was sent for testing from Arusha. These were stated to be blight free. They were planted in December 1947 and contracted Irish blight within a month of planting.

Seedlings.—In 1946 seedlings of 914b (52) which flowers and seeds freely were raised. These were separately harvested in March 1947 and tubers of any appreciable size were planted out still separately according to parentage in August 1947. These were lifted in December 1947 and the results were most disappointing as the products generally were small undersized tubers though larger in some cases than those produced by the original seedlings. The immunity to *P. infestans* has been retained apparently as none have shown symptoms of blight. Further plantings will be made in March 1948 of the more promising lines after discarding the weedy ones.

Xanthomonas solanacearum (*Brown Rot*).—In the 1946 47 short rains one plant of 914a (91) was found to be infected with *Xanthomonas solanacearum* (brown rot) in the plot of land used for trials at the office in Lushoto township. The infected material was destroyed and tubers from adjoining plants planted at a later date in the Senior Agricultural officer's garden were also found to be infected. All material from these two plots was subsequently destroyed and all tools were disinfected.

Two plants side by side in the 914a (91) July planting at the Lushoto farm were found affected by brown rot. A large area round them was isolated and disinfected by burning. Two other plants in different parts of the field were suspected but were not identified as brown rot, nevertheless similar precautions were taken.

Phytophthora infestans (*Irish Blight*).—The two Corstorphine varieties 1271b(9) and 1256a (23) as well as all the local varieties were affected in all plantings. 1271b(9) is immune to the A and B strains and not to the C strain and this variety contracted blight. On the other hand 877a(34) is also immune to strains A and B and susceptible to C yet was not affected by blight.

Alternaria (*Early Blight*).—This was present more or less in all varieties particularly after flowering but caused no damage.

Tuber Rots.—Specimens of all rots in tubers, particularly in 833b(98) which seems to be rather susceptible to "rots", were sent to the Plant Pathologist but only "storage rot" of a *Fusarium sp.* were found but not *Fusarium coerulium* which causes dry rot of potatoes. The fungus *Rhizoctonia solani* was found in one instance.

Hollow Heart.—This condition was identified by the Plant Pathologist in three tubers of 914a(91) sent him. The trouble is caused by resumed growth after a check.

Insect Pests

Cut worm.—In the July/August plantings an immense infestation of cut worm occurred and baiting did not help. The worms were removed daily and great quantities were collected over a month but little damage was done.

Eelworm.—Some tubers were found to be affected on lifting but these were few.

Mealy Bug.—This was effectively controlled on tubers in store by weekly applications of pyrethrum. As all potatoes are used as seed and affected flavour does not matter Gammexane 0·5 per cent is now being used and only one application during the sprouting period has so far proved an effective preventitive.

C. J. McGregor,
Senior Agricultural Officer,
Tanga Province

ANNUAL REPORT OF PLANT PATHOLOGIST, 1946

I was absent on vacation leave until the 10th August. Two weeks' study leave were spent at the Seed Testing Station, East Craigs, Edinburgh, and a week at the Imperial Mycological Institute, Kew. Other agricultural institutions were also visited.

Safaris totalling six weeks were undertaken to Arusha, the Eastern Province and the Usambaras.

Records of plant diseases new to the Territory, or on new hosts in the Territory are as follows:—

Vegetables.—Lima bean: on stems, *Cercospora canescens* Ellis and Mart., and *Phomopsis phaseoli* (Desm.) Grove; pod spots, *Colletotrichum truncatum* (Schw.) Andrus and Moore and *Macrophomina phaseoli* (Maubl.) Ashby; on pods *Epicoccum purpurascens* Ehrenb. Potato: on haulms, *Macrophomina phaseoli*; and leaf roll (virus). Pumpkin: leaf spot, *Phyllosticta orbicularis* Ellis and Everh. Rhubarb: on petioles, *Colletotrichum capsici* (Syd.) Butler group; leaf spot *Phyllosticta* sp. Sweet potato: leaf spot, *Cercospora ipomoeae* Wint.

Miscellaneous crops.—Pawpaw and *Albizzia gummifera:* Root disease, *Armillaria mellea* (Vahl ex Fr.) Quel. Para rubber: Mildew, *Oidium heveae* Steinmann. Tea: Root disease, *Botryodiplodia theobromae* Pat. and *Fomes lamaoensis* (Murr.) Sacc. and Trott. Oak: Mildew on leaves, *Oidium quercinum* Thum. *Atropa belladonna:* leaf spot, *Cercospora sp.* Bambarra groundnut: leaf spot, *Ascochyta phaseolorum* Sacc. Lucerne: leaf spot, *Pseudoplea trifolii* (Rostr.) Petrak; and on stems, *Colletotrichum capsici* (Syd.) Butler group. Sunn hemp: leaf spot, *Cercospora demetrioniana* Wint. Eucalyptus: leaf spot, *Sphaerella molleriana* Thum.

According to information received from the Imperial Mycological Institute, Kew, *Armillaria* appears not to have been recorded on pawpaw previously. Its occurence in pawpaw on Kilimanjaro, where the soil is neutral and the disease rare, indicates that this tree is very susceptible. Rhizomorphs of the fungus were traced back from one pawpaw tree to dead Grevillea roots. In a garden the disease spread from a dead Eucalyptus root to a pawpaw. It is important to distinguish this disease from pythium root disease as the control measures are entirely different.

Several cases of dieback of pawpaw trees were examined. The first symptoms are a diminishing size of the new leaves and premature leaf-fall. Finally no leaves remain and the tree dies. The immediate cause is an inadequate flow of water to the crowns, and this in turn has several causes: root disease resulting from attack by *Pythium* spp., or (in one field) *Armillaria mellea*, drought, and twisting of the roots when originally planted out; dieback is also associated with old age.

Anthracnose of banana fruits in the Bukoba District was severe. The plantation could not be visited, but it is recorded by the Agricultural Officer that the fields were weedy and the trees uncared for. Normally the disease occurs in a mild form on old soft fruit.

The brown streak virus of cassava was found present in a few areas of the Eastern Province and was the cause of death of many plants in affected fields. Affected stems and roots showed the normal brown rot, but the tubers in one area showed an equal amount of blue rotting. Near Mahenge infected plants were entirely covered by a mealy bug.

No cases of severe virus in sweet potato have been reported during the year. The disease was observed in the Eastern Province from Dar es Salaam to Utete, and from Kilosa to near Mahenge, in October, but in an extremely mild form at that season.

During the absence of the Plant Pathologist on leave, identifications of potato diseases kindly made by Dr. Nattrass, Nairobi, were: intense leaf roll, a virus disease; possible *Phloem necrosis*, an internal symptom sometimes accompanying leaf roll; and probable hollow heart, a physiological disease, from Lushoto.

A number of other diseases were observed, but these have all been referred to in previous annual reports.

I acknowledge much assistance received from the director and staff of the Imperial Mycological Institute, Kew.

Geo. B. Wallace,
Plant Pathologist

ANNUAL REPORT OF PLANT PATHOLOGIST, 1947

I was on duty throughout the year. On 13th January, Mrs. M. M. Wallace was reappointed Temporary Scientific Assistant on her return to the Territory from leave. A total of eighty nights were spent on safari by the staff in connection with disease surveys and the inspection of crops for disease. Particular attention was given to native grain crops, seed beans, pawpaws, potatoes and wheat. All provinces with the exception of the Southern Province were visited.

There has been an appreciable increase in the demands for laboratory service both from members of the Agricultural Department and from farmers. A number of enquiries from neighbouring territories have been dealt with. Germination tests with seed have been undertaken as required.

Publications.—The following papers were published by the Laboratory Staff:—

"Second Supplement to the Revised List of Plant Diseases in Tanganyika Territory", *East African Agricultural Journal*, XIII, 1, pp. 61-64.

"Kromnek Disease", *East African Agricultural Journal* XIII, 2, pp. 103-106.

"Mycological Circulars" Nos. 20 and 21, April and November, 1947—being recent records of plant diseases in the Territory.

Articles were published in the local press. Five other papers have been submitted for publication or are in course of preparation.

Visitors.—Among distinguished visitors to the Laboratory were: Dr. B. A. Keen, Director of the East African Agricultural and Forestry Research Organization, and Sir Maurice Holmes and Mr. L. G. Corney of the Salaries Commission. The honourable the Director of Agricultural Production visited the Laboratory in May and November, and the Deputy Director in March.

New Records of Plant Diseases in 1947

The majority of the diseases in the following list have been more fully discussed in Mycological Circulars 20 and 21.

Field Crops

Beans, French.—"Yellow scars" on seed, non-parasitic, in the variety "Prince". This is thought to result from a hereditary weakness in the seed coats.

Cacao.—On pods, *Glomerella cingulata* (Stonem.) Spauld. and Schrenk.

Cotton.—Damping off of seedlings, *Corticium solani* (Prill. and Delacr.) Bourd and Galz; Ascochyta blight, *A. gossypii* Syd., observed once only, at Lubaga; Leaf spot, *Glomerella gossypii* Edgerton.

Cowpea.—Leaf spot, *Septoria vignae* P. Henn.

Flax.—"Pasmo" disease, *Sphaerella linorum* Wollenw., in the Septoria stage, found in one field and not serious. It is already known in Kenya.

Elephant grass.—Leaf spots, *Nigrospora oryzae* (Berk. and Br.) Petch, and *Phyllachora penniseti* Syd.

Oats.—Loose smut, *Ustilago avenae* (Pers.) Jens.

Onion.—Neck rot, *Botrytis allii* Munn. was very destructive in the Mbulu District. It was found that the spores can be carried on the seed, and that this infection can be largely controlled by a mercurial dust.

Pawpaw.—Leaf and fruit spot, *Ascochyta caricae* Pat.; Powdery mildew, Oidium sp.; Mosaic (virus).

Pigeon Pea.—Wilt, Fusarium sp. (being identified).

Rye.—Leaf blotch, *Helminthosporium sativum* Pamm., King and Bakke.

Sorghum.—Leaf spot, *Cercospora sorghi* Ellis and Everh., common; Zonate leaf spot, *Gloeocercospora* sorghi Bain and Edgerton, common; *Eudarluca australis* Speg., parasitic in rust pustules of Maize and Sorghum.

Sunflower.—Kromnek (virus): serious on one farm only; this will be further investigated.

Sugar cane.—Red rot, *Physalospora tucumanensis* Speg. (more commonly known as *Colletotrichum falcatum* Went.)

Tobacco.—Kromnek (virus): in two plants only, and these were destroyed. This disease was described in the East African Agricultural Journal.

Wheat.—Black point of grains, and leaf spot, *Helminthosporium sativum* Pamm., King and Bakke.

Yam.—Rust, *Uredo dioscoreae* P. Henn.; leaf spot, *Glomerella cingulata* (Stonem.) Spauld, and Schrenk.

Vegetables

Broad Bean.—Leaf spot, *Colletotrichum lindemuthianum* (Sacc. and Magn.) Briosi and Cav.; Rust, *Uromyces fabae* (Pers.) de Bary; Root disease, *Macrophomina phaseoli* (Maubl.) Ashby in the *Rhizoctonia bataticola* stage.

Cucumber.—Powdery mildew, *Erysiphe cichoracearum* DC.

Vegetable marrow.—Downy mildew, *Pseudoperonospora* cubensis (Berk. and Curt.) Rostowz.

Trees

Apple.—Mildew, *Podosphaera leucotricha* (Ellis and Everh.) Salmon; Root diseases' *Ustulina zonata* (Lev.) Sacc., and *Armillaria mellea* (Vahl ex Fr.) Quel.

Avocado pear.—Canker, destructive to individual trees. A fungus isolated from the cankers has still to be identified.

Lemon and Grapefruit.—Blue mould, *Penicillium italicum* Wehmer.

Cupressus lusitanica.—Canker, *Monochaetia unicornis* (Cooke and Ellis) Sacc. Recorded in Kenya; may prove to be a limiting factor to further planting.

Hagenia anthelmintica.—Armillaria root rot, *A. mellea* (Vahl ex Fr.) Quel.

Salix babylonica.—Armillaria root rot, *A. mellea.*

Ornamentals

Arctotis grandis.—Mould of young leaves, *Botrytis ginerea* Pers.

Bougainvillaea.—Armillaria root rot, *A. mellea.*

Calendula.—Rust, *Aecidium* sp.

Carnation.—Root disease, *Macrophomina phaseoli* (Maubl.) Ashby, in the Rhizoctonia stage.

Eschscholtzia.—Mildew, *Leveillula taurica* (Lev.) Arn.

Gerbera jamesonii (Barberton daisy).—Leaf spots, *Septoria gerberae* Syd. and *Ascochyta gerberae* Maffei; Mildew, Oidium sp.; Sclerotium wilt, *S. rolfsii* Sacc.

Nasturtium.—Leaf spot, *Heterosporium* sp.

Notes on Diseases Previously Recorded in the Territory

Bean French.—In a survey of bean diseases made in July and August, the most common and destructive disease was a spotting of stems, leaves and pods caused by *Isariopsis griseola* Sacc. Anthracnose, *Colletotrichum lindemuthianum* (Sacc. and Magn.) Briosi and Cav. was found in two fields; other diseases were mild. A report on observations was sent to the seed bean growers.

Chick pea.—Cases of total loss in fields at Tabora by Ascochyta blight (*A. rabiei* (Pass.) Lab.) were reported.

Pawpaw.—Fields in the Northern Province were visited. The most serious trouble this year was attributed to the prolonged wet, dull and cool weather. It was described in a report sent to pawpaw growers. The subject of pawpaw diseases has been written up for the *East African Agricultural Journal.*

Potato.—The bacterial Brown rot, *Xanthomonas solanacearum* (E. F. Smith) Dowson was recorded from a few fields in the Southern Highlands Province. A few plants were again found infected at Lushoto. Tubers with Internal brown fleck from Bukoba were grown at Lyamungu and produced a healthy crop. The strain of *Phtophthora infestans* causing Irish blight in the Usambaras is stated by Dr. W. Black, Edinburgh, to differ from strains A, B and C, as known in England, and to be either an entirely new biotype, or a more virulent form of strain C.

Sweet potato.—Both the virus disease and the Stem rot (*Plenodomus destruens* Harter) have been extremely mild this year.

Wheat.—Brown rust, *Puccinia triticina* Erikss. was the cause of unusually heavy loss in the Northern Province.

Acknowledgment.—The assistance of the Director and staff of the Imperial Mycological Institute, London, in identifying certain fungi is gratefully acknowledged.

Geo. B. Wallace,
Plant Pathologist

DETAILS OF PROVISION AND EXPENDITURE

Sub-head	Provision from 1/1/1947 to 31/12/47 £	Expenditure from 1/1/1947 to 31/12/47 £
Head 5. Agriculture		
Personal Emoluments		
1 to 40. Personal Emoluments	92,380 ...	81,009
Other Charges		
41. Transport and Travelling	16,000 ...	14,208
42. Maintenance and Running of Motor Vehicles...	3,000 ...	2,415
43. Books of Reference	300 ...	277
44. Contingencies	110 ...	122
45. Office and General	850 ...	867
46. Tents	1,200 ...	1,237
47. Uniforms	1,750 ...	1,923
48. Agricultural Development Special Services	450 ...	87
49. Contribution to Native Treasuries' Seed Farms	1,040 ...	1,004
50. Expenditure on Cotton Tax Services	3,300 ...	3,095
51. Increased Food Production :—		
(a) Crop Production	3,500 ...	3,131
(b) Production of Vegetable Seed	50 ...	–
(c) Expenses of Production Committees	900 ...	194
52. Laboratory Equipment	2,600 ...	744
53. Plant Sanitation	170 ...	76
54. Purchase of Planting Material	150 ...	53
55. Tools Implements and Equipment	600 ...	380
56. Sisal Experimental Station, External Field Trials	2,060 ...	994
57. Upkeep of and Minor Improvements to Agricultural Stations	11,530 ...	10,670
58. Upkeep of Agricultural Training Centre and Ploughing Schools	250 ...	117
59. Upkeep of Coffee Research Station	4,000 ...	3,493
60. Upkeep of Government Plantations	200 ...	327
61. Improvements of Copra Industry	300 ...	168
62. Bukoba Coffee Culture	500 ...	281
63. Citrus Industry Grading and Inspection	100 ...	51
64. Haricot Bean Production	500 ...	893
65. Onion Nursery, Mbulu	1,000 ...	331
66. Purchase of Motor Vehicles	4,500 ...	1,390
67. Purchase of Machinery for Sisal Experimental Station ...	630 ...	–
68. Electric Generating Plant	150 ...	160
69. Multiplication of Seed	730 ...	735
70. Production of Nicotine Sulphate	250 ...	24
71. Maize Bonus Payments	48,000 ...	65,587
72. Equipment for Fisheries Officer	– ...	32
73. Purchase of Duplicating Machine	– ...	87
Total ...	203,050 ...	196,162

DEVELOPMENT FUNDS PROVISION AND EXPENDITURE

Head and Sub-heads	Provision from 1/1/1947 to 31/12/1947	Expenditure from 1/1/1947 to 31/12/1947
D.—1. CONSERVATION AND DEVELOPMENT OF NATURAL RESOURCES		
A. Agriculture and Animal Husbandry		
	£	£
1. 5 Field Officers (£400-500)	2,000 ...	1,197
3. Development of Rice Production, Southern Province (Recurrent for 10 years)	1,170 ...	1,161
4. Development of Rice Production, Southern Province (Capital)	200 ...	108
5. Coffee Experimental Station, Bukoba (Recurrent for 10 years)	1,600 ...	14
6. Coffee Experimental Station, Bukoba (Capital)	5,000 ...	74
7. Agricultural Training for Indians (Recurrent for 10 years) ...	2,000 ...	105
8. Agricultural Training for Indians (Capital)	4,000 ...	7,259
9. Training of Agricultural Instructors (Recurrent for 10 years)	7,000 ...	6,241
10. Training of Agricultural Instructors (Capital)	24,000 ...	4,277
15. Cotton Experimental Station, etc., Ilonga (Recurrent for 10 years)	2,100 ...	7
16. Cottor Experimental Station, etc., Ilonga (Capital) ...	36,000 ...	10,506
17. Extension of Ukiriguru Experiment Station (Recurrent) ...	2,100 ...	580
18. Extension of Ukiriguru Experiment Station (Capital) ...	35,000 ...	7,035
19. Houses for Field Officers (Capital)	5,100 ...	2,605
21. Houses for African Agricultural Instructors	4,200 ...	1,271
22. Soil Conservation, Eastern Kilimanjaro (Recurrent)... ...	2,800 ...	486
23. Development of Tumbi and Mwanhala Sub-stations (Recurrent)	500 ...	33
24. Development of Tumbi and Mwanhala Sub-stations (Capital)	6,000 ...	1,491
25. Rehabilitation of Mlalo Basin (Recurrent)	1,450 ...	1,150
26. Rehabilitation of Mlalo Basin (Capital)	1,000 ...	614
27. Construction of Dams for the Development of Rice Production (Capital)	10,000 ...	1,637
28. Cowshed, Lyamungu (Capital)	400 ...	17
29. Improvement of Supplies of Planting Materials (Recurrent)...	1,000 ...	494
30. Luengira and Kitivo Irrigation (Recurrent)	500 ...	–
31. Improvement of Copra Industry (Recurrent)...	2,000 ...	–
38. Purchase and Erection of a Saw Gin	1,300 ...	–
39. Loan to Tanga Native Administration for Purchase of Pilot Plant, etc.	750 ...	750
40. Reorganization of Bukoba Native Coffee Industry	5,000 ...	5,000
41. Passages	540 ...	–
42. Cost of Living Relief	500 ...	363
Total ...	165,210 ...	54,475
D. 1.—CONSERVATION AND DEVELOPMENT OF NATURAL RESOURCES		
(D. Development of Water Supplies Scheme D.627)		
46. Reconnaissance and Hydrographic Survey	3,000 ...	698